Chesapeake & Ohio Canal
National Historical Park
Wildland Fire Management Plan

2004

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EXECUTIVE SUMMARY

The wildland fire management policies of the National Park Service (NPS) support Chesapeake & Ohio Canal National Historical Park's resource management goals. The overriding goal is providing for firefighter and public safety and protection of natural and cultural resources, and protection of human developments from unwanted wildland fire.

This Wildland Fire Management Plan contains the following program direction:

To guide the decision-making process where safety, social, political, and resource values are evaluated, and appropriate management response strategies are identified for wildland fires.

To provide a framework for fuels management strategies through the use of prescribed fire, and mechanical treatments.

To provide a basis from which to cooperate more fully in planning and implementing a wildland fire program across agency boundaries.

Program operations included in the Plan are:

1) preparedness
2) prevention
3) suppression
4) and fuels management.

Applicable resource goals and objectives are derived from approved agency resource and general management plans.

The Plan is organized to combine the latest scientific knowledge, including regional and local studies, with policy direction from the National Park Service, the Departmental of the Interior, the Federal Wildland and Prescribed Fire Management Policy and Program Review (USDI/USDA1995), and other Federal Government level wildland fire policies to accomplish resource and fire management goals and objectives. The intent of the plan is primarily operational in nature.

This Plan is in compliance with the requirements found in the National Environmental Policy Act (NEPA). These requirements ensure a prudent assessment and balance between a federal action and any potential effects of that action, leading to consensus between fire managers, agency resource specialists, and the public. Any constraints or limitations imposed on the fire management program are also included.

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I. INTRODUCTION

A. The Fire Management Plan

National Park Service (NPS) wildland fire management activities are essential to the protection of human life and property, the protection and management of irreplaceable natural and cultural resources, and to the accomplishment of the NPS mission. The Chesapeake & Ohio Canal National Historical Park (C & O Canal) Wildland Fire Management Plan (the Plan) is the primary planning document directing park wildland fire management activities at C & O Canal. These activities include preparedness planning and activities, fire staffing and training, prevention, suppression, and the use of mechanical fuel treatments to achieve management and resource management objectives.

This Plan meets the requirement of Director's Order-18 (DO-18) that all NPS park units with burnable vegetation have a wildland fire management plan approved by the superintendent.

C & O Canal will review and update the fire management plan annually. Annual review is essential to ensure that the Plan continues to conform to current laws, objectives, procedures and strategies. A comprehensive plan revision, and National Environmental Policy Act (NEPA) compliance review, is required every five years. C & O Canal will provide a digital copy of each approved Fire Management Plan and all subsequent amendments to the NPS Fire Management Program Center (FMPC), located at the National Interagency Fire Center (NIFC), in Boise, Idaho.

B. Collaborative Processes Used to Develop The Plan

The C & O Canal General Plan (1976), Statement for Management (1991), Resource Management Plan (1996), and the Fire Management Plan are all developed with input from neighboring communities, and other NPS program management areas. A General Management Plan will be prepared for the C & O Canal starting in 2004. Completion is estimated to be within 5 years.

The activities covered by the Plan have been given due consideration in balance with other NPS unit management activities.

The superintendent is responsible for assuring policy compliance and the technical and operational soundness of the wildland fire management plan before he or she approves

it. Before approving the plan, the superintendent sought the review and advice of Park staff, area and regional staff, and other fire professionals.

C. Implementation of Federal Fire Management Policy

This Fire Management Plan will implement fire management policies and help achieve resource management and fire management goals defined in:

(1) Federal Wildland Fire Management Policy and Program Review (1995)

(2) Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy (USDOI/USDA, 2002)

(3) A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10 Year Comprehensive Strategy Implementation Plan (2001)

(4) The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide (1998)

(5) Managing the Impacts of Wildfires on Communities and the Environment (2002)

(6) National Fire Plan (2001)

(7) 10-Year Comprehensive Strategy (2001)

(8) Implementation Plan, 10-Year Comprehensive Strategy (2001)

(9) National Park Service Management Policies (2001)

(10) Chesapeake & Ohio Canal National Historical Park General Plan (1976)

C & O Canal has developed a Resource Management Plan (1996). The goals and objectives in the resource management plan have generally been incorporated into this Plan. The FMP is usually a component of the park's Resources Management Plan (RMP) and is designed to facilitate the achievement of the park's cultural and natural resource management objectives. There is no mention however of fire management in the park's current RMP (1996) nor is it mentioned in the park's General Plan (1976), Statement for Management (1991) or enabling legislation of January 8, 1971 (Public Law 91-664).

D. Environmental and Cultural Compliance

Wildland fire suppression is conducted within C & O Canal as an emergency action. This plan states that other elements associated with wildland fire management, such as prescribed fire, fuel management, burned area rehabilitation, etc., are non-emergency actions and will be individually evaluated under the requirements of NEPA, the National Historic Preservation Act (NHPA) and other applicable regulations.

Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-making addresses NEPA compliance for the National Park Service. It lists various activities that qualify as categorical exclusions (CE) which do not require environmental assessments or environmental impact statements. However, these categorical exclusions did not adequately address the topic of fire management. The *Federal Register,* June 5, 2003, Vol 68, No. 108, pages 33814-33824, amends the categorical exclusion list by adding two CEs for fire management that will expedite compliance for smaller, more routine situations. These new categorical exclusions are:

1.12 Hazardous fuels reduction activities using prescribed fire not to exceed 4,500 acres, and mechanical methods for crushing, piling, thinning, pruning, cutting, chipping, mulching, and mowing, not to exceed 1,000 acres. Such activities:

- Shall be limited to areas (1) in wildland-urban interface and (2) Condition Classes 2 or 3 in Fire Regime Groups I, II, or III, outside the wildland urban interface;
- Shall be identified through a collaborative framework as described in "A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan;"
- Shall be conducted consistent with agency and Departmental procedures and applicable land and resource management plans;
- Shall not be conducted in wilderness areas or impair the suitability of wilderness study areas for preservation of wilderness;
- Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and may include the sale of vegetative material if the primary purpose of the activities is hazardous fuels reduction."

1.13 Post-fire rehabilitation activities for lands and infrastructure impacted by fires or fire suppression not to exceed 4,200 acres (such as tree planting, fence replacement, habitat restoration, repair of roads and trails, and repairs of damage to minor facilities such as campgrounds) to repair or improve lands unlikely to recover

to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire. Such activities;

- Shall be conducted consistent with agency and Departmental procedures and applicable land and resource management plans;
- Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and
- Shall be completed within three years following a wildland fire.

Because C & O Canal staff has chosen a suppression-only policy for the park, it has been determined that this policy meets the requirements for a categorical exclusion 1.12. Due to the cultural resource base of the C&O Canal, all post-fire rehabilitation actions, even if they meet the criteria of CE #1.13, will be processed through the NEPA Environmental Screening Process of Director's Order #12, NHPA, and other applicable regulations. The Environmental Screening Form (ESF) and support material for the review of this *Wildland Fire Management Plan* 2004 is attached.

E. Authorities for Implementation of Fire Management Plan

The authority for fire management is found in the National Park Service Organic Act (Act of August 25, 1916), which states the Agency's purpose:

"... is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

This authority was further clarified in the National Parks and Recreation Act of 1978:

"Congress declares that...these areas, though distinct in character, are united...into one national Park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

Additional statutory authorities are:

- The General Authorities Act of 1970
- Public Law 91-664 (C & O Canal Enabling Legislation, 1971)
- The Clean Air Act, Clean Water Act

- The Endangered Species Act
- The Antiquities Act.

II. LAND MANAGEMENT PLANNING AND FIRE POLICY

A. NPS Management Policies as Related to Fire Management

The *National Park Service Management Policies (2001)* is the basic Service-wide policy document of the National Park Service. It is the highest of three levels of guidance documents in the NPS Directives System. *National Park Service Management Policies* is designed to provide NPS management and staff with clear information on NPS policy, required and/or recommended actions, and other information to help them manage parks and programs effectively. Appendix B contains a summary of elements relating to compliance with the 2001 Federal Wildland Management Policy.

National Park Service Management Policies include the following guidance related to the preparation of fire management plans and the management of fire on national park sites:

> - *Park fire management programs will be designed to meet park resource management objectives while ensuring that firefighter and public safety are not compromised. (NPS Management Policies, Chapter 4.5).*

Each park with vegetation capable of burning will prepare a fire management plan and will address the need for adequate funding and staffing to support its fire management program. The plan will be designed to guide a program that responds to the park's natural and cultural resource objectives; provides for safety considerations for park visitors, employees, neighbors, and developed facilities; and addresses potential impacts to public and private property adjacent to the park. Preparation of the plan will include collaboration with adjacent communities, interest groups, state and federal agencies, and tribal governments. (*NPS Management Policies, Chapter 4.5*).

All fires burning in natural or landscaped vegetation in parks will be classified as either wildland fires or prescribed fires. All wildland fires will be effectively managed through application of the appropriate strategic and tactical

management options. These options will be selected after comprehensive consideration of the resource values to be protected, firefighter and public safety, and costs. Prescribed fires are those fires ignited by park managers to achieve resource management and fuel treatment objectives. Prescribed fire activities will include monitoring programs that record fire behavior, smoke behavior, fire decisions, and fire effects to provide information on whether specific objectives are met. All parks will use a systematic decision-making process to determine the most appropriate management strategies for all unplanned ignitions, and for any prescribed fires that are no longer meeting resource management objectives. (*NPS Management Policies, Chapter 4.5*)

There may be situations in which an area may be closed to visitor use to protect the natural resources (for example, during an animal breeding season) or for reasons of public safety (for example, during a wildland fire). Such closures may be accomplished under the superintendent's discretionary authority, and will comply with applicable regulations (36 CFR 1.5 and 1.7). (*NPS Management Policies, Chapter 4.1*)

The second level of NPS guidance documents (under *NPS Management Policies*) are Director's Orders. Director's Orders provide operational policies and procedures that support and supplement Management Policies. Director's Orders are often further supported with a third level of guidance consisting of reference manuals or handbooks. Specific guidance to the NPS on wildland fire is contained in Directors Orders (DO-18) and attendant Reference Manual (RM-18), and "The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide" (1998).

Director's Order 18 – Wildland Fire Management and *Reference Manual 18 – Wildland Fire Management* are the documents that provide National Park Service units with specific guidance on the preparation of wildland fire management plans and on wildland fire and prescribed fire management. DO-18 states:

> *Wildland fire may contribute to or hinder the achievement of park management objectives. Therefore, park fire management programs will be designed to meet resource management objectives prescribed for the various areas of the park and to ensure that firefighter and public safety are not compromised. Each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the park's natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities.*

> *The NPS is committed to protecting park resources and natural ecological processes; but firefighter and public safety must be first priority in all fire management activities.*

RM-18 states that the paramount considerations of each park fire management program will be:

1. Protection of life, both employee and public
2. Protection of facilities and cultural resources
3. Perpetuation of natural resources and their associated processes
4. Perpetuation of cultural and historic scenes.

These priorities are further emphasized in RM-18 (chapter 3, page 1) with the following language:

> *Safety is the responsibility of everyone assigned to a wildland or prescribed fire incident. The safety of employees and visitors alike must be of prime concern during fires. Agency administrators at all levels need to stress that firefighter and visitor safety always takes precedence over property and resource loss*.

B. C & O Canal NHP Enabling Legislation

The first federal legislation pertaining to the C&O Canal was the Capper-Cramton Act of May 29, 1930, which authorized the George Washington Memorial Parkway along both sides of the Potomac River to just above Great Falls. This bill also included "the shores of the Potomac, and adjacent lands . . . from Fort Washington to a similar point above the Great Falls on the Maryland side except within the District of Columbia, and including the protection and preservation of the natural scenery of the Gorge and the Great Falls of the Potomac and the acquisition of that portion of the Chesapeake and Ohio Canal." In its final form, the Capper-Cramton Act authorized acquisition of the C&O Canal as far upriver as Point of Rocks.

The Capper-Cramton Act followed and was in accordance with Public Law 69-202 of June 6, 1924, known as the "National Capital Park and Playground Act." An important purpose of the latter was to:

> Prevent pollution of Rock Creek and the Potomac and Anacostia Rivers, to preserve forests and natural scenery in and about Washington, and to provide for the comprehensive, systematic, and continuous development of the park, parkway, and playground system of the National Capital.

This act thus provides additional guidance for the protection of natural scenery, forests, and water quality for park lands from the Maryland/District line to Great Falls, including the scenery as viewed from the Virginia side of the Potomac River.

President Franklin D. Roosevelt purchased the entire C&O Canal from the financially troubled B&O Railroad in 1938, using authority granted under the National Industrial Recovery Act of 1933. This act gave the president power to purchase any property for unemployment relief measures.

Under Proclamation 3391 on January 18, 1961, President Dwight D. Eisenhower created the Chesapeake and Ohio Canal National Monument. This monument included all canal property between Seneca and Cumberland, but had little practical effect as it contained no funding and did not authorize any expansion or development. This proclamation followed a protracted, but unsuccessful attempt to pass a bill in Congress to establish a national historical park.

The C&O Canal National Historical Park finally was authorized by Public Law 91-664 ("Chesapeake and Ohio Canal Development Act") on January 8, 1971. The new Park was created from federal lands under the administration of the George Washington Memorial Parkway, federal lands within the Chesapeake and Ohio Canal National Monument, and from state and private lands.

This law defined the specific purposes of the park to:

> Preserve and interpret the historic and scenic features of the Chesapeake and Ohio Canal, and to develop the potential of the canal for public recreation, including such restoration as may be needed.

Section 7 of this law further directed that the park be administered in accordance with the 1916 Act and amendments.

The 1971 law provided for access to the Potomac River or non-federal lands for the purpose of hunting at locations designated by the Secretary. As this provision allows for access only and does not permit hunting within the park, and allows the National Park Service to designate locations for such access, it requires increased management (administrative and enforcement).

The 1971 act also directs park management to consider local and state development, land use, or recreational plans and to manage, whenever practicable, park lands in a manner that does not conflict with such plans. It also directs that management meet and consult with a Chesapeake and Canal National Historical Park Commission on general policies and specific matters relating to the administration and development of the park.

Specific uses provided for in the enabling legislation, which allow some impairment or derogation of resources, include retainment of existing rights and valid permits. These include perpetual easements for rights-of-way authorized by Public Law 83-184 of August 1, 1953:

> For purposes of electric, telephone, and telegraph lines or conduits, or for other utility purposes incident to industrial, commercial or agricultural use, or to the supply of water for domestic, public, or any other beneficial use.

The 1971 law also authorized other uses of park lands, and utility, highway, and railway crossings. There are some constraints on these uses, since the 1953 law directs that easements be subject to such reasonable conditions as are necessary for the protection of the Federal interests. In addition, the 1971 enabling legislation states that permits are not to be in conflict with the purposes of the park and are [to be] in accord with any requirements found necessary to preserve park values.

These easements also are subject to the interest reverting to the United States for breach of restrictions or abandonment:

> No part of said easements shall be used for any other than the purposes for which they are granted, and in the event of any breach of this restriction, or in the event of any failure to observe the conditions in said easements . . . or in the event the said easement is abandoned for the purposes granted, the entire interest . . . shall . . . revert to the United States.

These stated mandates demonstrate the complexity of managing the Park and the evolution of the administration of the area.

C. C & O Canal NHP General Management Plan

A General Management Plan will be prepared for the C & O Canal starting in 2004. It is estimated to be 5 years or more before completion. Currently the C & O Canal operates under an approved General Plan (1976).

The main function of a General Management Plan (GMP) is to identify desired resource conditions and visitor experiences to be achieved by the Park over a 10 to 20 year period. The desired resource conditions and visitor experiences ultimately determine the strategies, programs and actions the Park will utilize.

All parks within the National Park System are required by law to operate under approved general management plans. This ensures that park managers carry out the mission of the NPS and the individual park unit as effectively and efficiently as possible.

The GMP provides a foundation to guide and coordinate all subsequent park planning and management. Other park planning documents, including fire management plans and resource management plans, must follow the management direction of the GMP.

Although fire management is not directly addressed in the C & O Canal General Plan, the decisions made when controlling any fire on the site must not contradict C & O Canal's purposes and goals as stated in the GP. The important purposes of Chesapeake & Ohio Canal National Historical Park as described in its enabling legislation and reflected in the GP, which direct this C & O Canal FMP are:

1. To preserve, protect, and maintain the historic resources and to prevent further deterioration and decay based on a level of stabilization, restoration or reconstruction through a practical preservation program.

2. Preserve and protect the atmosphere of past times and enduring natural beauty and safeguard historic remains and natural features.

3. Impart to visitors an understanding and appreciation of an historic way of life blended into the natural setting of the Potomac Valley.

4. Develop the potential of the park's recreation resources for safe yet stimulating enjoyment by the visitors of the historic resources and natural features within limits compatible with management objectives #1 and #2.

5. Interpret to the visitor the canal's reason for being, its construction, and role in transportation, economic development and westward expansion; including the way of life which evolved upon it and the history of the region through which it passes and to give an insight into the era of canal building in the United States, specifically the C&O Canal.

6. To cooperate with agencies of the State of Maryland, as well as other governmental agencies, including the C&O Canal National Historical Park Commission, organizations, and private individuals to help ensure that the use and development within the park and its vicinity are compatible to the greatest possible degree with protection of park resources and high quality experiences for its visitors.

7. To communicate to the local and regional public, activities and programs of the park in a way that promotes understanding of the purposes, mission, and significance of the park.

8. Through cooperation with outside interests, to assure adequate public access to the park's information, orientation, and recreation facilities and to minimize, through appropriate regulation, the adverse effects associated with public use of numerous minor access roadways leading to the park.

9. To promote safety programs, particularly relating to the Potomac River, among visitors and park employees.

10. Provide the park recreational user with a natural hiking, biking and camping experience, rather than structured recreational playgrounds or other man-made facilities.

11. To manage the park in the most energy efficient manner using the best technology available.

D. C & O Canal NHP Resource Management Planning

C & O Canal currently has an approved Resource Management Plan which was written in 1996. The plan is due for revision. Like the GP, the Resource Management Plan makes no direct references to fire or fire suppression. It does place a strong emphasis on protection of the natural and cultural resources of the park.

E. Meeting GMP and RMP Goals Through the Plan

Implementation of the Chesapeake & Ohio Canal National Historical Park Fire Management Plan will help meet the objectives of the General Management Plan and Resource Management Plan by:

- Contributing to the preservation and rehabilitation of historic landscapes
- Protecting historic, cultural, and natural resources
- Ensuring human health and safety throughout fire management programs and activities

The Fire Management Plan is a detailed program of action to implement fire management policies and objectives.

III. Wildland Fire Management Strategies

All fires that are not ignited by park managers for specific purposes are defined as wildland fires. All wildland fires will receive management actions appropriate to the safety of firefighters and the public, the resources and values to be protected, the condition of fuels, current and predicted fire behavior, weather, and topography to accomplish the specific objectives for that individual fire. These management actions,

termed “appropriate management responses,” will vary from fire to fire and may vary within an individual fire.

A. General Management Considerations

The primary goals of the wildland fire management program at C & O Canal are to protect human health and safety, protect property, enhance community protection, diminish risk and consequences of severe wildland fires, and to the extent possible, increase health of the ecosystem.

To accomplish these goals, wildland fires at C & O Canal will normally be managed through suppression strategies. Fire managers will balance the potential impacts of wildland fire with the potential impacts of fire suppression activities in choosing the appropriate management response.

Important values to be protected at C & O Canal include the cultural landscapes (and the natural resources of which they are composed) and historic structures associated with the Park. Values to be protected also include natural resources and processes, natural levels of biodiversity, and archeological resources.

The Chesapeake and Ohio National Historical Park lies adjacent to the Potomac River for 184.5 miles between Washington, DC and Cumberland, Maryland and spans four physiographic provinces. These provinces include the Coastal Plain - Washington to Great Falls (mp 0-5), the Piedmont - Potomac Gorge to Harpers Ferry (mp 5-60), the Blue Ridge - Harpers Ferry to Hancock (mp 60-120), and the Ridge & Valley - Hancock to Cumberland (mp 120-184.5)

The geographic provinces within which the park lies along with the influences of the Potomac River are responsible for the rich geologic, ecological, and biological diversity found within its boundaries. If not today, in the future, the C&O Canal NHP manages or will manage one of the largest acreage holdings of unfragmented floodplain forests within the east.

The C&O Canal NHP administers 46 sites recognized as state and nationally significant natural areas.

Nationally/Globally Significant Natural Resources

The Potomac Gorge along with the Great Falls of the Potomac River represents one of the most outstanding and dramatic examples of Atlantic coast fall line representing unique river geology and terrace ecosystems represented along the east coast US. Except for some private land holdings, much of the lands within this are administered by the George Washington Memorial Parkway and the C&O Canal. Within the C&O Canal,

the river terrace ecosystem lies between Great Falls and Key Bridge and contains the last remaining reserves for many rare and endangered plant species. Near the Paw Paw Tunnel and the bends are several Appalachian shale barren communities containing globally rare and unique plants. They are believed to be the only representatives of this type of community in the National Park Service. The park is one of the most biologically diverse, especially for plant species, in the National Park Service.

Regionally Significant Natural Resources

The State of Maryland Natural Heritage Program considers the C&O Canal NHP to have the most significant biodiversity resources in the Mid-Atlantic States (Bartigis, Wiegand, pers. communication). The park has recorded over 1,200 species of vascular plants, including over 260 non-native plant species, over 100 rare, threatened or endangered species of plants in Maryland and The District of Columbia, and one federally endangered plant species.

Numerous ecological factors along the Potomac River create a mosaic of these different natural habitats. From the fall line to western Maryland, geologic formations support diverse native plant communities. Isolated populations of western species survive where rare prairie habitat persists along the river. Floodplain forest, in addition to limestone forest, provides excellent habitats for native plants. Areas along the Potomac River are subject to frequent floods, causing canopy gaps, scouring and deposition that creates a diversity of habitats and organisms. Distributions of many northern and southern plant species overlap the Potomac River. Upland piedmont forest covers the remainder of the park, providing a significant forested habitat corridor.

Rare limestone and other calcareous outcrop natural communities occur in the park, especially in the Great Valley section and the Dickerson (Chilton) Woods are of Montgomery County. Because limestone soils are highly productive for agriculture uses, these forest habitats are the most impacted from development of eastern deciduous forest types to agricultural lands. The limestone forest are not well represented within the National Park Service and The Nature Conservancy has estimated that most of the remaining 1,500 acres (was 500,000 acres) of rare limestone forests and out crop communities in Maryland lie within C&O Canal NHP.

The number of rare plants represents one of the highest concentrations of state-listed rare plants in the eastern US and is one of the most biologically diverse areas in the Mid-Atlantic States. Several species are globally rare, and some occur here because they are dependent upon special habitats and ecological conditions present along the Potomac River. Thus, the C&O Canal NHP provides a haven for numerous rare, threatened and endangered plant species and associated habits. Because of this, the park is considered to be very important to the state of Maryland. (Rare Plant Survey along the C&O Canal NHP and Potomac River, 1995, Richard Wiegand and Paula G. Becker).

Nationally Significant Cultural Resources

C&O Canal consists of an intact historical canal system that extends 184.5 miles from Georgetown in the District of Columbia to Cumberland, Maryland. For almost its entire length this canal closely follows the north bank of the Potomac River and its North Branch. The park contains over 500 historic canal-related structures, comprised primarily of lift locks, culverts, aqueducts, waste weirs and lock houses. In addition to canal-related resources, numerous historic structures associated with adjoining agricultural, industrial and transportation uses stand within the park boundary. More than 200 archeological sites, most recording a significant prehistoric presence along the Potomac, have been identified in the park as well. In summary, C&O Canal contains a tremendous depth and diversity of cultural resources that span almost all eras of American History.

B. Wildland Fire Management Goals

These goals are programmatic in direction and are intended to provide safe and effective implementation of the fire management plan.

Goal 1: Make firefighter and public safety the highest priority of every fire management activity.

Goal 2: Suppress all wildland fires, regardless of ignition source, to protect the public, private property, and natural and cultural resources of Chesapeake & Ohio Canal National Historical Park.

Goal 3: Manage wildland fires in concert with federal, state, and local air quality regulations.

Goal 4: Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.

Goal 5: Reduce wildland fire hazard around developed areas and areas adjacent to cultural and historic sites.

Goal 6: Use fire as a means to remove the vegetative debris produced by mechanical fuel treatments, normal maintenance operations, and storm damage.

Goal 7: Educate employees and the public about the scope and effects of wildland fire and wildland fire management.

These goals provide the programmatic direction for the wildland fire program. The goals meet the overall objectives found in the C & O Canal General Plan and the C & O Canal Resource Management Plan.

The C & O Canal fire management program goals reflect Federal fire policy, the core principles and goals of the *Comprehensive Strategy, and Cohesive Strategy* where supported by land and resource management plans.

C & O Canal's wildland fire management goals contribute to accomplishing the *National Park Service 10-year Comprehensive Fire Strategy (NPS, 2000)*. This strategy outlines goals and actions in four fire management program areas: oversight and accountability, wildland fire preparedness, wildland fire operations, and fire protection capabilities of rural fire districts.

C. Wildland Fire Management Options

The following wildland fire management options are available for use at C & O Canal:

1. Wildland Fire Suppression: Historically, all wildland fires have been suppressed at C & O Canal. Under this plan, the Park will continue to suppress all wildland fires using the most appropriate management action. Determination of the most appropriate management action will consider human safety, threat and potential damage to property, resources, and cost effectiveness. Suppression may not be used to accomplish resource objectives.

2. Prescribed Fire: Though a program of using prescribed fire at C & O Canal is not considered in this Plan, individual burns may be used for protection of cultural resources, especially historic scene restoration and maintenance, hazard fuel reduction, and natural resource objectives. If a determination is made that a specific prescribed fire is required, that prescribed fire will be subject to the requirements of NEPA, the NHPA and other applicable regulations.

Fire may be used to dispose of natural vegetative debris deemed infeasible or impractical to remove mechanically in a non-wildland fuel environment (parking lot, storage yard, gravel pit, snow-covered area, etc.). The debris may be generated from routine maintenance activities, piled debris generated from construction activities, removal of hazard trees, discarded building, and administrative materials. Debris burned in a non-wildland environment does not require a prescribed fire burn plan. Debris burned in a wildland environment (including on snow covered ground) requires a prescribed fire burn plan. Any material being burned for debris disposal must be classified as permissible to burn under applicable Federal, State, Tribal, and Local regulations.

The Park will follow all applicable guidance and regulations when using fire for debris disposal. NPS guidance on debris burning is found in RM-18.

3. Wildland Fire Use: Wildland fire use will not be used at C & O Canal. This option was rejected at this time due to the lack of fire management staff, the adjacent wildland/urban interface considerations and the lack of knowledge concerning the role that fire has historically had on the Park's natural resources.

4. Non-Fire Applications: The reduction or removal of fuels by mechanical means is an option that may be used for objectives such as protection of resources, historic scene restoration and maintenance, protection of private property located in the wildland/urban interface, invasive species control, or other natural resource objectives.

D. Description of Wildland Fire Management Strategies by Fire Management Unit

C & O Canal National Historical Park is defined as one FMU.

The C&O Canal National Historical Park is in the District of Columbia and the Sate of Maryland, extending from the mouth of Rock Creek in Georgetown to Cumberland, Maryland, and parallel to the Potomac River most of the distance. Four very small portions of the park are in West Virginia at the abutments of dams' no. 3, 4, 5, and 6. Approximately 6 miles (123.80 acres) of the approximate 35 miles of the abandoned Western Maryland railroad added to the park by Public Law 95-625 on November 10, 1978, are located in Morgan County, West Virginia.

In Maryland, the C&O Canal Park lies in the counties of Montgomery, Frederick, Washington, and Allegany. The Congressional districts are the sixth and the eighth.

In West Virginia, the park lies in the counties of Morgan and Mineral. The Congressional district is the second.

In the District of Columbia, the park begins at Rock Creek in Georgetown and runs upstream beside the Potomac River. The total area within the District of Columbia is represented by the District delegate to Congress.
A comprehensive description of land status including existing federal and non-federal ownership, and privately owned in-holdings can be found in the current Land Protection Plan. (September 2003)

Preplanned decisions based on historical fire behavior indices will be considered in selecting appropriate management responses for suppression. The Park will not use wildland fire for resource benefit at this time. The Park's use of wildland fire will not be used at this time due to the lack of fire management staff, the adjacent wildland/urban

interface considerations and the lack of knowledge concerning the role that fire has historically had on the Park's natural resources.

Wildland fires at C & O Canal are managed with the support of local community fire departments. This community-based approach to wildland fire management involves partnership, cooperation and collaboration. (See appendix G)

Additional fire planning support and collaboration is provided by the National Capital Region Fire Management Office located in Sharpsburg, MD. The Regional FMO provides technical assistance to the Park on all fire management matters, including fire management programs such as the Weather Information Management System (WIMS), the NPS Wildland Fire Computer System, the National Fire Danger Rating System (NFDRS), the resource ordering system (ROSS), the Incident Qualification and Certification System (IQCS), Fire Program Analysis (FPA), and FIREPRO budgeting. The Regional FMO also assists with the Park's wildland fire qualification and certification program, coordination of fire training and mobilizations, development of cooperative agreements with local and state agencies, administration of Rural Fire Assistance Program grants to local fire departments, and developing fire prevention, preparedness, and suppression operational plans.

The Park, in accordance with NPS policy, uses Minimum Impact Suppression Tactics (MIST) in all fire management activities. MIST is defined as the application of techniques that effectively accomplish wildland fire management objectives while minimizing the impacts to cultural and natural resources commensurate with ensuring public and firefighter safety and effective wildland fire control. Examples of MIST include using existing natural or constructed barriers to contain wildland fires, mowing firebreaks in grassland, and using pumps and hoses to apply water to suppress fire activity and reduce fire spread.

Physical and Biotic Characteristics

Topography: The topography is highly dependent on the geology of the park (See geology.) The park stretches from Georgetown DC to Cumberland Maryland, 184.5 miles along the Potomac River. Most of the park is in the 50 year flood plain. There are some heights within the park where upland piedmont forests will be located. The canal and towpath were engineered to traverse about 650 feet rise in elevation over the 184.5 miles and the historic structures create a significant component of the cultural landscape.

Geology: The geology of the park is shaped by the fact that the 184.5-mile long park, mainly within a 2-mile-wide corridor centered on the Potomac River, is segmented east to west, from Georgetown to Cumberland, by geologic provinces and sections: the coastal plain, Piedmont Valley, Blue Ridge, and Valley and Ridge. A significant feature

of the park is the "Fall Line" or "Fall Zone" which is not a sharp line but rather a transition zone between the Coastal Plain and the Piedmont. The Great Falls of the Potomac are bounded by the C&O Canal and the George Washington Memorial Parkway. There are more than 100 bedrock formations identified along the Potomac River. Of these, there are 27 type-localities along the river, 21 type-localities near the river, and 24 type-localities within the Potomac River drainage basin. (Geology of the Chesapeake and Ohio Canal National Historical Park and Potomac River Corridor, District of Columbia, Maryland, West Virginia, and Virginia: USGS OFR-01-188B). The Geologic Mapping Division of the USGS completed a park wide geologic mapping project at a scale of 1:12000 and 1:24,000 as appropriate.

Soils: The soils of the park have been mapped by the USDA, NRCS National Cooperative Soil Survey. The data is linked to the National Soil Information System relational database, which gives the proportionate extent of the component soils and their properties. The soil map and data used in the SSURGO product were prepared by soil scientists as part of the National Cooperative Soil Survey. This soil survey depicts information about the kinds and distribution of soils on the landscape. The soils would correspond to the underlying geology of the park. (Soil Survey Geographic Database for Frederick County, MD 2001)

Elevation: The elevation ranges from near sea level to about 760 feet about sea level, with most of the topography being within the floodplain terraces of the Potomac River.

Hydrology: Portions of 161 perennial streams (37 named; 124 unnamed) and hundreds of intermittent streams pass through the park to the Potomac River or its larger tributaries. There are approximately 200 historic hydrological structures: culverts, waste weirs, aqueducts, and the canal.

Nearly 85 % of the park is within the 50-year floodplain of the Potomac River, much of which is non-tidal wetlands of the forested palustrine type (i.e., swamps, bottomland hardwood forests).

Seeps and springs can be found park wide and Karst topography and subterranean ecosystems, including 13 caves, 8 mines and associated speleothems and fauna, limestone sinks, and aquatic systems containing endemic groundwater invertebrates are documented. Vernal pools and at least 60 miles of the canal are naturally watered or maintained watered, all providing habitat for amphibian species and state rare and endangered wetland plants and two state rare crustaceans.

The park is adjacent to approximately 150 miles of Potomac River shoreline.

The park encompasses 19,236 acres (7694 hectares) within the Potomac River Basin with the majority of those acres are within the riparian zone and floodplain. Period flooding is part of the normal ecosystem (natural process) although some flood events are significant and cause damage to man made structures within the park.

Vegetation: The rich geological, ecological and biological diversity preserved inside the boundaries of the park include a wealth of communities such as riparian, terrace, upland forest, seeps and springs, cave and wetlands. More than 40 state and nationally significant natural areas, including Appalachian shale barren communities (areas that harbor globally rare plants, rare limestone outcrops and scoured bedrock floodplain, are found in the park. The park also protects the largest extant block of upland forest in Maryland's Piedmont, the Goldmine tract, and the highest quality limestone and calcareous shale habitats remaining in the state, Ferry Hill bluffs and Chilton Woods.

Invasive non-native plants have been introduced by human activity and disrupt natural ecological processes by crowing out and replacing native plants and animals through competition for space, light and water, and by creating new habitat conditions inhospitable to other natives. The park is home to over 260 non-native plant species, which are the most significant immediate threat to park natural resources and are a particular problem because of the competition they present to the very large number of state rare, threatened, and endangered plant species.

The park manages about 1,500 acres of land, which is under agricultural permit to local farmers, who raise crops and livestock including cattle and goats. All crops are grain, such as corn, soybean, hay and wheat. The agricultural permitting program allows the park to manage the cultural landscape in farming practices, common to the historic C&O Canal and adjacent communities. The farmed acreage can be found from Edwards Ferry, about mile 30 to Old Town, mile 170.

The park is currently in part of a region wide program to develop new and previously non-existent vegetation mapping. The products will describe the vegetation according to the NVCS National Vegetation Classification System.

Wildlife: The C&O Canal provides important habitat to many animals, aquatic and terrestrial during breeding and migration seasons and throughout the year. Aquatic environments in the park include wetlands, streams, rivers, springs and seeps, and open water habitat in the sections of watered canal. These habitats support animals such as frogs, toads, salamanders, fish, freshwater mussels, beaver, and muskrat. Terrestrial habitats such as forests, open fields, rocky outcrops, developed, and transition habitats support many common Eastern Deciduous woodland species: deer, song birds, red and gray fox, raccoon, gray and fox squirrels, and a few uncommon species, like the black bear and bobcat. Bald eagle, a federally threatened species, nests here and often.

The linear shape of C&O Canal along the riparian forest of the Potomac River provides a transportation corridor for wildlife. The corridor of unfragmented habitat is important for the preservation of the parks biodiversity, allowing for the movement of species between areas of higher quality or preferred habitat. Additionally, the larger blocks of

parkland of 100-500 acres provide important protected habitat to wildlife. As adjacent land becomes more developed or urbanized, corridors of contiguous, protected habitat will become increasingly important in the preservation of biodiversity and the maintenance of viable wildlife populations.

Numerous bird species can be observed throughout the year at C&O Canal NHP. Many are year round inhabitants while others are neo-tropical migratory traveling through the park from South and Central America, the Caribbean and southern US to North American nesting habitats. Scientists have found that certain migratory birds that utilize much of the habitat type found at C&O for breeding are declining worldwide. However, the Potomac River floodplain provides habitat for many migrating and breeding birds and is becoming increasingly important as natural areas are lost or fragmented in Maryland and all over the U.S. The American Bird Conservancy and National Audubon Society have designated C&O Canal as an Important Bird Area (IBA) in the U.S., small sites critical to rare species or that support large concentrations of a species.

The park contains a diverse native mussel community, including several species that are state and federally endangered. Native mollusks, or mussels, are the most imperiled aquatic fauna in North America and continue to decline primarily due to habitat loss and invasion of non-indigenous species. Of nearly 300 species of mussels in North America, 13 are considered extinct and 57 are designated federally endangered or threatened species. Of the 20 species of freshwater mussels in Maryland, 10 are in C&O Canal NHP.

Threatened and Endangered Species: The C&O Canal is one of the most biologically diverse parks, especially for plant species, in the National Park system. The park has recorded over 1,200 species of vascular plants, including over 260 non-native plant species, over 100 rare, threatened or endangered species of plants in Maryland and The District of Columbia, and 1 federally endangered plant species. The number of rare plants represents one of the highest concentrations of state-listed rare plants in the eastern US. Several species are globally rare, and some occur here because they are dependent upon special habitats and ecological conditions present along the Potomac River. 192 birds, 64 fish, 62 reptiles and amphibians, and 47 species of mammals are also documented. Extirpated species includes, the dwarf wedge mussel, the shortnosed sturgeon, and the Indiana bat. Ptilimnium nodosum (harperella), the one federally endangered plant species in the National Capital Region, is currently being reintroduced into the park. Several rare aquatic biota have either been found or are suspected to exist in the seeps, springs and cave communities of the park. Several bald eagle nests are monitored year round for activity.

Air Quality: The C&O Canal NHP is located in urban Washington DC and the metro area, passes into the suburbs of Montgomery County, through the agrarian lands of Frederick and Washington Counties and into the mountains of Western Maryland and Allegany County. Throughout the 184.5 mile stretch, the park passes through across

two 1-hour non-attainments and one 8 hour non-attainment zone. Allegany County is the only attainment area the park is in. The park is in a Class II Air shed. The park does not monitor for air quality but relies on the National Capital Region, Air Resources Program at the Center for Urban Ecology to coordinate with national-scale air quality monitoring programs both within and outside the National Park Service. The park staff regards all air quality alerts (ozone health advisories) posted for the metro Washington DC area.

Cultural Resources: There are a total of 1,365 historic structures within the park, most of which are deemed to be "contributing" elements to the Chesapeake and Ohio Canal National Historical Park historic district, listed in the National Register of Historic Places.

The most sensitive historic structures include 120 buildings (22 lock houses, 5 canal-operation buildings such as the Great Falls Tavern and section houses, 47 other historic buildings such as farm houses and their dependencies, 6 commercial structures such as stores and mills, and 4 governmental structures such as Washington Aqueduct features).

The canal-related structures include engineering works such as lift locks, culverts, bridges, waste weirs, and dams, primarily composed of fire-resistant materials such as stone, brick, and earth.

There are 15 formally recognized cultural landscapes within the park, including the 184.5 miles of canal and prism. Specific landscapes have also been identified at Abner Cloud/Potowmack Canal, Antietam Village, Carrollton Manor Farms, Cumberland, Ferry Hill, Fort Duncan/Christian Smith Homestead, Four Locks, Great Falls Tavern, Hancock, Old Town, Point of Rocks, Two Locks/Opequon Crossing, Williamsport, and Western Maryland Railway.

Strategic and Measurable Fire Management Objectives

The entire Park is designated as a single fire management unit (FMU) with a single set of management goals and objectives applying to the entire Park. These goals and objectives are listed below:

Goal 1. Maintain firefighter and public safety. Firefighter and public safety is the highest priority of every fire management activity.

> *Objective: 100 percent of wildland fire operations are conducted so that they cause no injuries to the public and no serious injuries to firefighters.*

Goal 2. Suppress unwanted and undesirable wildland fires regardless of ignition source to protect public health and safety, real property, and the natural, cultural, and historic resources of the Park.

Objective: 100 percent of wildland fires are controlled within 24 hours and limit wildland fires to less then 5 acres.

Objective: Protection of Park resources is actively considered in 100 percent of all wildland fire planning and fire management activities.

Objective: Consideration of resource protection will be described in 100 percent of all wildland fire planning and management documents (FMP, WFIP WFSA, BAER Plan, etc.).

Goal 3. Manage wildland fires in concert with federal, state, and local air quality regulations.

Objective: 100 percent of all wildland fires and debris burning will be conducted consistent with all Federal, State, and local smoke management regulations.

Goal 4. Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.

Objective: Cooperative agreements will be developed and maintained with all appropriate local, regional, and national fire management organizations.

Goal 5: Reduce wildland fire hazard around developed areas and areas adjacent to cultural and historic sites.

Objective: 100 percent of known hazardous fuel accumulation that could contribute to the damage of primary Park resources or the properties of neighboring landowners will be reduced by mechanical treatment.

Goal 6: Use fire as a means to remove the vegetative debris produced by mechanical fuel treatments, normal maintenance operations, and storm damage

Objective: 100% of all debris burning will be conducted in accordance with NPS policy and applicable state and local regulations.

Goal 7. Educate employees and the public about the scope and effects of wildland fire and wildland fire management.

Objective: All C & O Canal *employees will be able to provide basic fire information to visitors or direct them to a Park employee who is able to provide it.*

Objective: All Park staff with fire management responsibilities will receive sufficient training to bring them to the appropriate level of knowledge, skill, and certification and to maintain that certification.

Objective: When fire danger is very high or extreme, Park staff will strive to contact all Park visitors with a fire prevention message through signage, handouts, interpretive activities, personal contact press releases, web sites and other means.

Management Considerations

These constraints, considerations, or decision criteria will influence all fire management activities within the fire management unit.

(1) Health and safety

All fire management actions will have firefighter and public safety as its top priority. All Park firefighters will adhere to applicable NPS policy relating the training, certification, and performance of NPS wildland firefighters.

(2) No unacceptable impacts to cultural resources.

All appropriate steps necessary to protect the Park's cultural resources will be taken as long as those steps do not endanger firefighter and public safety.

(3) Ensure socio-political economic impacts, including those involving the wildland urban interface (WUI), are considered in developing implementation plans.

The effects of any fire management activity on the neighboring communities, with emphasis on the wildland/urban interface component of those communities will be considered during planning and implementation of those activities.

(4) Ensure that the public, organizations, and cooperating agencies are aware of any fire management operation that may have an impact on them.

To ensure good relations with Park neighbors, local organizations and governments, cooperating agencies and the public, every effort will be made to

keep these parties informed about significant fire management actions that might impact them or their interests.

Historic Role of Fire

The majority of the lands included in C & O Canal were cleared during the construction of the canal. No fire history of the area was recorded. The role of fire in the pre-European settlement of the area is unknown and should be studied.

According to NCR Archeologist, there are several references one can start with to get an aboriginal use of fire as a wildlife management tool. Roundtree, Helen (1989) *The Powhatan Indians of Virginia: Their Traditional Culture.* Norman: University of Oklahoma Press and (1990) *Pocahontas's People: The Powhatan Indians of Virginia Through Four Centuries.* Norman: University of Oklahoma Press. Also Turner, E. Randolph, III (1978) *An Intertribal Deer Exploitation Buffer Zone for the Virginia Coastal Plain-Piedmont Regions.* Archeological Society of Virginia Quarterly Bulletin 32(3):42-48. Colonists from Jamestown documented the Virginia Indians use of fire to create "deserts" at the heads of rivers. They also documented the use of fire to drive or surround deer and harvest them in great numbers.

Recent park records from 1993-2004 show that C&O Canal averages 2.66 fires per year with a low of 0 in 2003 and 2004 and a high of 9 in 1998. These fires ranged in size from .1 acre to 3 acres with only 4 fires over 1 acre in size. The majority were smoldering leaf litter or smoking logs of low intensity. The majority are the result of human carelessness including escaped campfires, discarded cigarettes and playing with fire. (See appendix H and attached maps)

Recent Department of Natural Resource records from the counties surrounding the park show that from 1990 – 2003 the average number of wildfires per year were as follows: Montgomery County - 7.3 fires, Frederick County - 26.9, Washington County – 23.5, and Allegany County – 36. These records represent approximately 25% of total wildfires. The remaining 75% are handled by volunteer fire departments.

E. Wildland Fire Management Situation

1. Historic Weather Analysis

C & O Canal is located in a temperate climate zone with well-defined seasons. Temperatures range from an average low of 32 degrees Fahrenheit in January to an average high of 80 degrees in July. The average annual temperature is 58 degrees. Humidity is moderate to high with an average annual precipitation of about 40 inches.

2. Fire season

Maryland traditionally experiences a split spring and fall fire season of higher fire danger. The spring fire season usually runs from March 1 through May 15 and the fall fire season runs from October 15 through December 15 according to the Maryland Department of Natural Resources Forest Service. Precipitation, green up and freezing temperatures are the controlling factors.

3. Fuel Characteristics (Anderson, 1982)

Fire Behavior Fuel Model 9 (Hardwood Litter) – 75% of the park falls under this Fuel Model. In fuel model 9, fires run through the surface litter faster than model 8 (7.5 chains/hour) and have longer flame lengths (averaging 2.6 feet). Fall fires in hardwoods are predictable, but high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning.

Fire Behavior Fuel Model 3 (Tall Grass) – 15% of the park falls under this Fuel Model. Fires in this fuel type are the most intense of the grass group and display high rates of spread under the influence of wind. Fires in the grass group fuel models exhibit some of the faster rates of spread under similar weather conditions, averaging 104 chains/hour (one chain = 66 ft.) with flame lengths of 12 feet. This would be representative of cultivated grain crops near harvest including: wheat, oats, barley, rye, corn, and soybeans and utility rights of way.

Fire Behavior Fuel Model 1 (Short Grass) – 1% of the park falls under this Fuel Model. Fire is in the surface fuel and can burn very rapidly. The rate of spread can be fast with relatively low fire line intensity. This fuel type represents unglazed grasslands and crop stubble.

Approximately 9% of the park has no burnable vegetation. (see map A for fuel models and surrounding land characteristics)

4. Fire Regime Alteration and Condition Class

The majority of C & O Canal is heavily forested with various eastern hardwood forest types. These forest types are considered to be in what is referred to as Natural Fire Regime 1. Natural fire in the context of this FMP is fire caused by for example, lightning rather than human caused. Natural Fire Regime 1 refers to a forest that has infrequent, low-intensity surface fires with a recurrence interval of up to 35 years. Most fires within this type of regime are small in area. While natural fires once played a variety of roles in the natural ecosystems that existed in the Middle Atlantic States prior to the arrival of Native Americans, historical evidence indicates that since the arrival of Native Americans and later human settlement, humans have caused the vast majority of wildland fires in the Mid-Atlantic region. Human caused fires have in turn had their own profound effect on the various ecosystems in this area.

Table 1 - Fire Regimes

Fire Regime Group	***Frequency (Fire Return Interval)***	***Severity***
I	0-35 years	low severity
II	0-35 years	stand replacement severity
III	35-100+ year	mixed severity
IV	35-100+ year	stand replacement severity
V	>200 years	stand replacement severity

Table 2 - Condition Class Descriptions

Condition Class[1] Descriptions	
Condition Class	***Fire Regime***
Condition	Fire regimes are within an historical range and the risk of

Class 1	losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

5. Control Problems & Dominate Topographic Features

Wildland-urban interface is perhaps the most critical issue in managing the fire program at the C&O Canal. A comprehensive description of neighboring landowners and agencies can be found in the 2003 Land Protection Plan. While most areas have good access for suppression resources, they also increase the values at risk and the probability of an ignition.

Control problems generally range from low to moderate depending on site specifics and burning conditions. Under normal fire seasons, control problems are expected to be low.

The topography is highly dependent on the geology of the park. (See geology, page 22) The park stretches from Georgetown DC to Cumberland Maryland, 184.5 miles along the Potomac River. Most of the park is in the 50 year flood plain. There are some heights within the park where upland piedmont forests will be located. The canal and towpath were engineered to traverse about 650 feet rise in elevation over the 184.5 miles and the historic structures create a significant component of the cultural landscape.

6. Other Management Considerations

Because the purpose of C & O Canal NHP is to preserve and interpret the historic and scenic features, all wildland fire management actions will emphasis the preservation of the historic structures. Other considerations are the wildland urban interface, as well as developing and maintaining good relations with assisting agencies, the community and with Park neighbors.

IV. Wildland Fire Management Program Components

A. General Implementation Procedures

Implementation of the components of the wildland fire management program at C & O Canal is consistent with the park's fire management capabilities and will consider the current and predicted conditions affecting fire behavior. When possible, preplanned decisions, based on historical fire behavior indices will be considered in *Stage I Wildland Fire Implementation Plan* development to select an appropriate management response.

A Wildland Fire Implementation Plan (WFIP) will be initiated for all wildland fires.
This plan will provide the framework for determining the appropriate management response. The WFIP Stage I: Initial Fire Assessment will be the responsibility of the Incident Commander or C & O Canal's Park Fire Management Officer. Since the Fire Management Plan requires suppression of all wildland fires, the requirement for a decision checklist as a part of the Stage I analysis can be considered met. Subsequently, Stage I analysis may be satisfied at the programmatic level in the Fire Management Plan through determinations made by combinations of values to be protected and/or fire behavior thresholds. A copy of the WFIP Stage I form can be found in Appendix D.

~~*B.*~~*B. Wildland Fire Suppression*

1. Range of potential behavior

(a) Timber Fuels

In Fire Behavior Fuel Model 9 (leaf-off hardwoods), fires run through the surface litter faster than Model 8 (Leaf-on hardwoods) at a rate of spread of 7.5 chains/hour as

opposed to 1.6 chains per hour and have longer flame lengths, averaging 2.6 feet as opposed to 1.0 feet. Fires within the hardwood forests of C & O Canal are generally restricted to surface fuels, consume leaf litter and branch wood, and reduce reproduction. Under most conditions, such fires are of low intensity and short duration. Flame lengths of 2 feet or less are common. Primarily wind and topography influence fire spread. Fire effects include the removal of surface fuels, occasional scorching of trees, and the reduction of young woody reproduction.

Larger mature trees (greater than 6" diameter at breast height (dbh) are susceptible to basal fire injury, which generally does not reduce diameter growth unless the crowns are appreciably damaged by fire. Damage to the cambium of larger trees is directly related to season of fire occurrence, intensity, duration of heat, bark thickness, and frequency of burning. Trees are generally less susceptible to fire injury during the dormant season. Seedlings and saplings of tree species other than oak-hickory are readily killed by fire.

According to studies conducted by Pennsylvania State University (Abrams, 1992), fire plays a significant role in development of oak forests. Relative to other hardwoods, fire should favor oaks because of their thin bark, sprouting ability, resistance to the rotting after scarring, and the suitability of fire-created seedbeds for acorn germination. Periodic fire should also check succession in oak forests because most successional species, such as maple, exhibit low resistance to fire. The clearing of successional species will also benefit the oak forest since oak species generally have low or intermediate tolerance to shade, and therefore their seedlings do not exhibit long-term survival or growth in the condition of a closed understory.

Under extreme conditions surface fires may torch out and occasionally crown where ladder fuels exist. The extent of such fire behavior is rather limited. Under these conditions, fire intensity may be sufficient enough to consume organic matter of mineral soil. Such conditions occur only during periods of severe and infrequent drought.

Monitoring programs should be established to evaluate and document the vegetative response to wildland and prescribed fires. Studies need to be conducted to learn the historical role that fire played in the ecosystem.

(b) Grass Fuels

Fires within the grass fuel models of C & O Canal are of low to moderate intensity and of short duration. Fires within this fuel type spread very rapidly under the influence of wind and topography. Flame lengths of 3 to 6 feet are common depending on fine fuel moisture content, height of the grass, and wind intensity. Fire intensity is generally sufficient to consume all herbaceous surface fuels, and kill shrubs and scorch trees where present. Herbaceous vegetation usually increases in both density and vigor following fires.

2. Preparedness actions

Preparedness" refers to activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination. Preparedness includes planned activities for the development and implementation of the wildland fire management program. These activities include staffing, training, fire prevention activities, education, provision and maintenance of support facilities, purchase of and contracting for equipment, supplies, support, planning and coordination, policy development and oversight, research, and interagency coordination."

Departmental policy requires that all personnel engaged in wildland fire suppression and prescribed fire duties meet the standards set by the National Wildfire Coordinating Group (NWCG, *PMS-310-1*). C & O Canal will conform strictly to the requirements of the NPS wildland fire management qualification and certification system.

Although C & O Canal has no specific wildland firefighter positions, employees will be encouraged to become qualified as wildland firefighters in order to support the Park's fire management program. The Park FMO will be responsible for obtaining the training required to meet Park needs for qualified wildland firefighters. When advanced or specialized training is necessary, the Park FMO will work through the Area Fire Management Officer to obtain funding and enrollment. The Park FMO will coordinate the Park's fire training needs with those of other nearby parks, cooperating agencies, and the region. Park wildland firefighters will attend an annual wildland firefighter safety refresher.

a. Fire Prevention, Education, and Community Assistance

C & O Canal's fire prevention and education program may be implemented in conjunction with other fire management and public safety agencies to increase awareness of fire prevention, develop understanding of the dangers and benefits of fire, protect human life and property, and prevent damage to cultural resources, real property, and natural resources.

The program of public education regarding wildland fire prevention, potential fire benefits and dangers will be conducted as appropriate to help support Plan goals. Visitor contacts, bulletin board materials, handouts, and interpretive programs may be used to increase visitor, leases and park neighbor awareness of fire hazards and benefits. The Area fire prevention and education specialist may provide assistance to the park for its fire prevention, education and community assistance programs.

Park employees will be provided with information about fire prevention, the wildland/urban interface, the objectives of the fire management program, and the dangers and benefits of prescribed fire and wildland fire. Employees will be kept informed about changes in the fire situation throughout the fire season.

Park staff will work with the local fire departments and other agencies with fire management and public safety responsibilities to establish common protocols and procedures identify training needs, conduct joint training, and develop strategies for safer and more efficient fire management operations.

b. Fire Danger

A specific daily fire danger rating is not generated for the Park. The park will utilize the fire danger rating generated by the State of Maryland and at the Antietam National Battlefield when it comes on line. This rating will also be available through the NCRCC.

c. Fire Weather

C & O Canal does not maintain a fire weather station. Current fire weather information is available through the National Weather Service Forecast Office in Sterling, VA. Access to this information is available at www.erh.noaa.gov/er/box. The closest National Weather Service recording station is in Sterling, VA. Access to specific weather data covering the areas around the park can be found at: http://iwin.nws.noaa.gov/iwin/ct/zone.html

d. Step-Up Staffing Plan

The following actions will be taken to ensure adequate fire preparedness based upon the daily fire danger rating for the general area surrounding the Park.

Fire Danger "Low" or "Moderate": (Staffing Level 1 and 2) No activity necessary. Normal eight (8) hour tours of duty. Wildland fire qualified personnel are available to respond and take necessary action on any fire reported.

Fire Danger "High": (Staffing Level 3) Normal eight (8) hour tours of duty. Fire equipment and supplies serviced and prepared for use.

Fire Danger "Very High" or "Extreme": (Staffing Level 4 and 5) Normal eight (8) hour tours of duty. The Park is totally prepared to respond to a fire. Location of wildland fire qualified personnel is known to all relevant personnel. Wildland

fire qualified personnel have fire tools and personal protective equipment immediately available in their work vehicles or at their work site. Emergency FIREPRO funding is available through the Regional Fire Management Officer to extend duty hours of wildland fire qualified personnel.

3. Pre-Attack Plan

No written or formal pre-attack plan exists for C & O Canal. Volunteer fire departments have developed their own protocols and procedures for initial attack of fires within the Park. Historic structures receive the highest priority in regard to any suppression action. The measures currently being taken to prevent the damage or destruction of these structures by fire include keeping the grass mowed in at least a four-foot radius around each of these structures. The highest priority structures should be considered for retrofitted fire alarm systems.

4. Initial Attack

a. Priority setting during multiple fire occurrences

Public and firefighter safety.

Protection of improvements and private property.

Protection of cultural, historic, and natural resources with emphasis on T&E.

Utility rights of way

b. Criteria for appropriate initial attack response consistent with GMP/RMP objectives

Public and firefighter safety.

Protection of improvements and private property.

Protection of cultural, historic, and natural resources.

Minimum fire-line construction and use of Minimum Impact Suppression Tactics (MIST).

Available suppression resources and response times.

Fire behavior as determined by fuels, weather, and topography.

Use aircraft and mechanized equipment only where necessary to support above-listed criteria.

c. Confinement as a Strategy

Confinement may be used to minimize resource damage and to provide for firefighter safety.

A confinement strategy may be selected for initial attack as long as it is not being used solely to meet resource management objectives.

Resource benefits may be a by-product, but the strategy must be based upon the criteria listed above.

A confinement strategy may also be selected in the WFSA process when initial attack has failed to contain a wildland fire. This strategy may also be used to minimize resource damage and to provide for firefighter safety.

d. Response Times

Response time for initial attack ground resources is approximately one hour or less depending on proximity, accessibility, and other such variables. Extended attack resources should be able to respond in two to six hours, again depending on proximity and availability.

e. Restrictions and Special Concerns

The constraints on these strategies affect the manner in which the wildland fire will be suppressed, or the prescribed fire will be managed. A resource advisor will be assigned to all significant fires.

Fire retardant can stain or corrode historic structures and will not be used in the vicinity of these structures. If wooden structure protection is necessary, Class “A” foams may be used. Any fire suppression activity in the vicinity of a known historic site will receive guidance from a designated resource advisor.

Use of heavy equipment, mechanical or ground disturbing equipment will be used only as a last resort.

f. Local Issues

C & O Canal depends on local volunteer fire departments for initial and extended attack. This close alliance requires that C & O Canal work closely with these agencies in planning, training, preparedness, and other fire management issues.

5. Extended attack and large fire suppression

a. Extended Attack Needs:

Extended attack needs will be determined by considering the following:

- Threats to life, property, and park resources
- Availability of suppression forces

b. Implementation plan requirements – Wildland Fire Situation Analysis (WFSA) development:

When a fire escapes initial attack, a new strategy must be developed to suppress the fire. This selection process is accomplished through the development of a WFSA.

The WFSA is a decision process that employs a systematic and reasonable approach to determine the most appropriate management strategy for a particular situation. Reasonable management alternatives are identified, analyzed, and evaluated, and is consistent with the expected probability of success /consequences of failure. The Superintendent shall approve the WFSA and any revisions. Evaluation criteria include firefighter safety, anticipated costs, resource impacts, and social, political, and environmental considerations. The evaluation of alternatives becomes the triggering mechanism for re-evaluation of the WFSA.

An electronic version of a WFSA can be found at the U. S. Forest Service website at http://www.fs.fed.us/fire/wfsa/.

c. Incident Management Transition:

Transition to an incident management team requires a briefing by the Superintendent and a limited delegation of authority for the suppression of the fire(s). The briefing should address agency specific concerns, priorities, firefighter and public safety, economic and resource concerns, and other topics or issues of importance and relevance to the suppression effort.

6. Exceeding WFIP and New Strategy Selection

A WFIP has been exceeded when a fire cannot be suppressed during initial attack suppression actions, or when a prescribed fire becomes an escaped fire. Then, a Wildland Fire Situation Analysis must be developed. When completed, the WFSA will develop a new strategy by which the fire should be managed.

7. Minimum Impact Suppression Tactics

- All fire management activities in C & O Canal will rely on tactics, which do a minimum amount of resource damage while maintaining the safety of firefighters, personnel, and the public as the highest priority.

- Fire line construction will be minimized by taking advantage of natural barriers, rock outcrops, trails, roads, streams, and other existing fuel breaks.

- Limbing along the fire line will be done only as essential for the suppression effort and for safety.

- Unburned material may be left within the final line.

- Clearing and scraping will be minimized.

- Snags or trees will be felled only when essential for control of the fire or for safety of personnel.

8. Rehabilitation Guidelines

When a suppression action is taken, rehabilitation may be necessary. The most effective rehabilitation measure is prevention of impacts through careful planning and the use of minimum impact suppression tactics. The Incident Commander will initiate immediate rehabilitation actions. Rehabilitation will be directed toward minimizing or eliminating the effects of the suppression effort and reducing the potential damage and hazards caused by the fire.

These actions may include:

- Construct water bars to prevent erosion.
- Place “bone yards” of cut vegetation in a natural or random arrangement.
- Position cut ends of logs so as to be inconspicuous to visitors and camouflage where possible.
- Flush cut stumps, camouflage with soil and moss.
- Remove hand line berms.

If re-vegetation or seeding is necessary, only native plant species will be utilized, and the Natural Resource Specialist will be consulted for approval of the species chosen. Rehabilitation efforts should be initiated as soon as they can be safely implemented, which may be before the fire is declared controlled.

If extensive emergency rehabilitation is needed or if rehabilitation is needed to reduce the effects of a wildland fire then the Park can request appropriate funding through the Burned Area Emergency Rehabilitation (BAER) fund. The BAER fund is administered through the NPS Branch of Fire and Aviation Management at the National Interagency Fire Center. The specifics of the policy can be found in 620 DM 3 DOI BAER Policy (2001). BAER project requests totaling $300,000 or less can be approved by the Regional BAER Coordinator. Submissions over this amount are reviewed at the regional level, and forwarded to the Fire Management Program Center for approval. Requests for BAER funding must be made to the Area Fire Management Officer within 72 hours of control of the fire.

9. Records and Reports

The Park FMO is responsible for all fire related records and reports except the WFIP. This responsibility may be delegated to an incoming Incident Commander for any fire escaping initial attack.

~~C.~~C. Wildland Fire Use

This option was rejected at this time due to the lack of fire management staff, the adjacent wildland/urban interface considerations and the lack of knowledge concerning the role that fire has historically had on the Park's natural resources. All unscheduled wildland fires in C & O Canal will be suppressed using the most appropriate management action.

~~D.~~D. Prescribed Fire

Though a program of using prescribed fire at C & O Canal is not considered in this Plan, individual burns may be used for protection of cultural resources, especially historic scene restoration and maintenance, hazard fuel reduction, and natural resource

objectives. If a determination is made that a specific prescribed fire is required, that prescribed fire will be are subject to the requirements of NEPA, the NHPA and other applicable regulations. All prescribed fire operations will adhere to NPS prescribed fire policies and procedures found in RM-18.

~~1.~~1. Planning and Documentation

An approved burn plan will identify need resources, individual responsibilities, and timelines. These activities include scheduling of resources, coordination with neighboring agencies and communities, and obtaining necessary permits.

a. Long-Term Prescribed Fire Strategy

The purpose of prescribed burning at C & O Canal would be to protect and preserve the cultural resources of the Park, manage vegetation (specifically invasive plant species), and reduce fuel loading. Prescribed fire objectives will be to:

i. Manage vegetation to maintain vistas, cultural landscapes and to promote the growth of native grasses and control woody vegetation on earthworks

ii. Assist with the establishment and maintenance of the historic scene

b. Funding

FIREPRO funding requests for individual projects may be submitted to the Area Fire Management Officer. Documentation of individual project costs will be submitted to the Area Fire Management Officer for review. Expenditures will not exceed the authorized project amount.

c. Annual Planned Project List

Proposed projects may be submitted to the Park Fire Coordinator by any division chief. The Park Fire Coordinator will compile a list of these projects and submit them to the Superintendent for approval and prioritization.

2. Needed Personnel

C & O Canal does not have sufficient personnel trained to manage a prescribed fire. Personnel needed for a specific burn will be identified in the projects burn plan. The Park will participate in a coordinated approach to mutual prescribed fire programs with partners to be determined at the time of the burn.

3. Fire Weather, Effects, and Behavior Monitoring

Monitoring of prescribed fires at C & O Canal is intended to provide information for quantifying and predicting fire behavior and its ecological effects on Park resources while building a historical record. Monitoring measures the parameters common to all fires: fuels, topography, weather, and fire behavior. In addition, ecological changes such as species composition and structural changes will be monitored for several years after a fire. This information will be very useful in adjusting the prescribed fire program to better meet short and long-term resource objectives.

During prescribed burning, monitoring will include mapping, weather, site and fuel measurements, and direct observation of fire characteristics such as flame length, rate of spread, and fire intensity. Operational monitoring provides a check to insure that the fire remains in prescription, and serves as a basis for evaluation and comparison of management actions in response to measured, changing fire conditions, and changes such as fuel conditions and species composition.

All prescribed fires will be monitored regardless of size. The Park FMO will establish specific fire information guidelines for each fire to update intelligence about the fire.

The Park FMO will assure that assigned qualified personnel are used to monitor the behavior of prescribed fires. By being able to assess fire's potential, characterize and quantify its effects, and determine if it is within prescription, an efficient and flexible monitoring program will result.

C & O Canal will use the fire monitoring protocols with adaptations described in NPS Fire Effects Monitoring. Fire monitoring support will be coordinated with the Area Fire Management Officer.

4. Prescribed Fire Project Critique

A Fire Management Committee will critique each prescribed fire. A report detailing the actual burn will accompany any recommendations or changes deemed necessary in the program. This report will be submitted to the Superintendent. A critique of the fire management program, including the prescribed fire program, will be held by the Fire Management Committee each year prescribed burns are conducted at the conclusion of the fall fire season.

5. Reporting and Documentation Requirements

All prescribed fire forms will be completed as outlined by the Park FMO. A fire monitor will be assigned to collect all predetermined information and complete all necessary forms prior to, during, and after the fire. All records will be archived in C & O Canal's fire records for future use and reference.

The Park FMO will prepare a final report on the prescribed fire. Information will include a narrative of the fire operation, a determination of whether objectives were met, weather and fire behavior data, map of the burn area, photographs of the burn, number of work hours, and final cost of the burn.

The forms necessary for documenting prescribed fire activities are outlined in RM-18. The Individual Fire Report, DI-1202, and the Incident Record, is the responsibility of the Park FMO and documents all personnel and equipment costs involved in the burn.

6. Historic Fuel Treatment Map

Because prescribed fires have not been used at C & O Canal in the past, no historic fuel treatment map exists.

7. Local Prescribed Burn Plan Requirements

Park prescribed fire burn plans identify preplanned requirements (prescriptions) for initiating and continuing prescribed burn ignitions and operations. These prescriptions are found in RM 18 Ch 10 and include:

- Maximum Manageable Area (MMA) for the fire
- Minimum number of fire crew
- Specific skill certification requirements for the fire crew
- Other fire-related staff requirements
- Range of possible ignition dates
- Pre-ignition site preparation requirements
- Equipment needed on-site
- Fuel model(s) used
- Acceptable temperature, humidity, wind direction, wind speed, and fuel moisture ranges
- Predicted fire behavior

8. Exceeding Prescribed Fire Burn Plan

If the prescribed fire escapes the burn unit and immediate efforts at control are not successful, it will be declared a wildland fire and suppressed. A Wildland Fire Situation Analysis (WFSA) will be completed and additional personnel and resources ordered as determined by the Incident Commander. If the fire continues to burn out of control, additional resources will be called from the local and volunteer fire departments. An

incident management team or other non-local resources may be requested to assume command of the fire.

9. Air Quality and Smoke Management

a. Air Quality Issues:

The park is located in a Class II Air shed and throughout its 184.5 miles, the park passes through two 1-hour non-attainment zones (Montgomery and Frederick County), and one 8 hour non-attainment zone (Washington County). Allegany County is the only attainment area the park is in. The Fire Management Plan will be in compliance with the Clean Air Act and all local State Department of the Environment laws regulating air quality.

The objectives for smoke management and compliance with air quality laws are similar to those for fire management: to encourage a natural process so long as it does not endanger public health and safety. Smoke levels become unacceptable when they impair visibility to such a degree that they detract from visitor enjoyment of the primary Park resource with emphasis on the vistas of C & O Canal. Dense smoke within C & O Canal is generally unacceptable; however, it may be tolerated for short periods if the winds assure good mixing. C & O Canal will also evaluate the forecasted impact of smoke on local communities and visitor safety. All of these considerations are difficult to quantify, monitor, and evaluate, and there will exist considerable room for discretion.

It may be necessary to aggressively control fires when smoke affects a sensitive area or creates a significant public response. All fire activities may have to be curtailed when an extended inversion or air pollution episode is in effect. Traffic control measures will be undertaken in conjunction with local law enforcement agencies when such episodes occur. Complaints regarding smoke will be documented and communicated to the Superintendent.

b. Smoke Mitigation:

C & O Canal will notify the surrounding assisting agencies, prior to any fire ignition. Thereafter, smoke characteristics will be evaluated regularly. A process will be developed for implementation to determine if adverse impacts to air quality and visibility are occurring from management decisions.

To minimize the effects of smoke the following guidelines will be considered when planning a prescribed fire:

Burning will be conducted only when visibility exceeds 5 miles or when the fire weather forecast indicates the presence of an unstable air mass, afternoon

mixing heights are 500 meters or greater, and ventilation rates (mixing height in meters X transport wind speed in meters per second) is 2000 or greater.

10. Debris Burning

Fire is occasionally used to dispose of natural vegetative debris deemed infeasible or impractical to remove mechanically in a non-wildland fuel environment (parking lot, storage yard, gravel pit, etc.). The debris may be generated from routine maintenance activities, piled debris generated from construction activities, removal of hazard trees, discarded building and administrative materials. Any material being burned for debris disposal must be classified as permissible to burn under applicable Federal, State, Tribal, and Local regulations.

Debris burned in non-wildland environments do not require a prescribed burn plan. Debris burned in a wildland environment, including snow-covered ground, requires a prescribed fire plan.

The Park follows all applicable guidance and regulation when using fire for debris disposal.

Parameters for debris burning are:

- Temperature: Less than or equal to normal average high temperature for the month.
- Wind Speed: Less than 10 mph.
- Relative Humidity: Greater than 40%.
- Fine Fuel Moisture: Surrounding fuels greater than 20%.
- Smoke Dispersal: Mixing heights equal to or greater than 500 meters.

~~E.~~E. *Non-Fire Fuel Treatment Applications*

~~1.~~1. Mechanical treatments

a. Annual Activities

Hazard fuels at C & O Canal are typically managed through mowing (grasses and other herbaceous vegetation), raking or vacuuming (fallen leaves), cutting and chipping (woody vegetation), or other mechanical or cultural means.

Fuels around buildings, boundaries, roads, trails, picnic areas and other sites occasionally accumulate sufficient fuel density to create a hazard to real property, historic resources, or human health and safety. These fuels are usually managed by mechanical removal. These fuels should be removed from these areas at least twice annually.

Firebreaks are maintained around most structures in the Park. These firebreaks are typically re-mowed every two to four weeks during the growing season depending on the importance of the resource, the amount of visitation in the area, and the availability of staff and equipment.

Heavy equipment including industrial mowers, large trucks, and trailer-mounted wood chippers are often used in mechanical fuel removal. Heavy equipment except mowers should usually be confined to existing roads and trails. In all cases, tracked and wheeled vehicles should only be used off roads and on trails under conditions where they will not significantly disturb soils, compact soils, or break up vegetative cover.

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~~F.~~F. Emergency Rehabilitation and Restoration

On January 19, 2001, the Department of the Interior issued new policy on burned area emergency stabilization and rehabilitation. The specifics of the policy can be found in 620 DM 3 DOI BAER Policy (2001). The Park FMO and the Natural Resource Specialist, subject to review by the Park Fire Committee, will jointly formulate a rehabilitation plan for each fire. The BAER plan will be submitted to the Regional BAER Coordinator (Regional Prescribed Fire Specialist) through the Area Fire Management Officer for approval within 72 hours of the date the fire is declared controlled. BAER project requests totaling $300,000 or less can be approved by the Regional Baer Coordinator. Submissions over this amount are reviewed at the regional level and forwarded to the NPS Fire Management Program Center for approval.

V. ORGANIZATIONAL AND BUDGETARY PARAMETERS

A. Organizational Structure of the Fire Management Program

This section discusses areas of responsibility for implementation of the fire management program by specific Park position. There may be instances that the same person functions in two areas of responsibility, e.g., the Natural Resource Specialist and the Park FMO may be the same person. The purpose of this section is to clearly define areas of responsibility, provide clear direction and accountability, and further the development of a responsive fire management program.

1. Superintendent

Fire management at C & O Canal is the responsibility of the Superintendent, with technical duties and accompanying responsibilities delegated to staff members. The Superintendent will be responsible for management of the program within Departmental and National Park Service policy, Director's Order 18; Wildland Fire Management (DO-18), and all relevant laws and regulations.

a. Ensures that a comprehensive fire management program is adequately planned, staffed, implemented, and that the Fire Management Plan is reviewed annually and revised as necessary.

b. Maintains and facilitates public and media relations pertaining to both suppression and prescribed fire.

c. Approves prescribed fire plans.

d. Signs delegation of authority to I.C. if incident exceeds capabilities of park staff.

2. Acting Superintendent

Is delegated all decision making responsibility when the Superintendent is absent from the Park.

3. Natural Resource Specialist

a. Coordinates fire research efforts, and serves as the primary resource advisor for project fires or prescribed fires.

b. Serves as a member of the Fire Management Committee.

c. Develops natural resource objectives for prescribed fire.

d. Plans and coordinates prescribed fires and non-fire hazard fuels and wildland/urban interface treatment projects.

4. Park Fire Management Officer

a. Responsible for implementation and execution of all aspects of the Park fire management program except research.

b. Responsible for overall coordination, direction, and supervision of wildland fire prevention, preparedness, and suppression and coordinates all wildland fire emergencies.

c. Briefs the Superintendent on current and planned fire management activity.

d. Develops and recommends approval of the Fire Management Plan to the Superintendent.

e. Serves as chair of the Fire Management Committee. Presents approved committee recommendations to the Superintendent.

f. Responsible for overseeing all Park fire management program activities. Prepares and administers the Fire Management Plan and the annual FIREPRO budget. Revises the plan annually and incorporates any necessary changes.

g. Responsible for completing the prevention analysis to determine the level and type of prevention effort required by the Park. Ensures implementation of the approved fire prevention program.

h. Responsible for initial attack and implementation of appropriate suppression response as recommended by the Fire Management Committee.

i. Responsible for the overseeing of safe suppression of all wildland fires, demobilizations, and rehabilitation of the burned area.

j. Responsible for submission of fire situation reports to NPS Branch of Fire Management through the Area Fire Management Officer.

k. Responsible for providing fire-training opportunities to Park personnel to maintain predetermined fire qualification skills in critical positions. Reviews, updates, and maintains fire training and fire experience records. Submits updated records to the Area Fire Management Officer.

l. Ensures adequate inventory of equipment and supplies to efficiently implement the fire management program.

M Coordinates the development of specific prescribed fire plans and execution of approved prescribed fires in accordance with RM-18. Submits each prescribed fire plan to the Superintendent for approval.

n. Ensures that both a briefing statement and delegation of authority, approved by the Superintendent, are prepared for incoming Incident Management Teams.

q. Coordinates dispatch of Park personnel for in-Park fire assignments and to provide assistance to other Parks and agencies. Requisitions fire crews, or fire resources and supplies for use within the Park.

r. Prepares, reviews, and revises cooperative agreements with interagency cooperators. Maintains liaison with interagency cooperators through annual meetings to review agreements.

s. Maintains technical references, maps, and aerial photos for the fire program.

t. Responsible for completion of all fire reports (DI-1202s), and coordinates the timely entry of reports into the NPS Fire Management Computer System through the Area Fire Management Officer within 10 days of a fire.

u. Coordinates initial attack of wildland fires.

5. Regional Fire Management Officer

a. The regional Fire Management Officer is the FIREPRO funded Fire Management Officer for the Regional Fire Management Office.

The Regional FMO provides the first level of technical assistance to the park for all fire management planning, and implementation activities. This includes assistance for managing the Park's use of fire management programs such as the National Fire Danger Rating System, the Weather Information Management System (WIMS), the NPS Wildland Fire

Computer System (SACS), the resource ordering system (ROSS), the Incident Qualification and Certification System (IQCS), Fire Program Analysis (FPA), FIREPRO budgeting, etc.

The Regional FMO assists with the Park's wildland fire qualification and certification program, fire monitoring, fire training and mobilizations, development of preparedness, suppression, wildland/urban interface, fuels management and prescribed fire operational plans, development of cooperative agreements with local and state agencies, and administration of Rural Fire Assistance Program grants to local fire departments. The Regional FMO coordinates fire management needs**.**

The Regional Fire Management Officer has delegated authority for the management of the region's fire management program. The Regional FMO is responsible for planning, training, technical assistance, budget prioritization, coordination, and interagency issues for units of the National Park Service in the Region. The Regional FMO assures that the regional fire management program is conducted accordance to established policy and procedures and that FIREPRO funds are used appropriately.

The Regional FMO represents the parks in the region to the NPS Fire Management Program Center, VICC, and other regional and national fire management organizations.

b. Park requests for assistance from the Regional FMO will be coordinated through the Park FMO. Requests should be made as far in advance as is practical.

c. The Regional FMO will assist the Park in acquiring needed resources and equipment, and in preparing FIREPRO funding requests.

d. The Regional FMO may be requested to serve on an incident management team as an agency representative regarding fire management operations.

6. Area Fire Prevention and Education Specialist

The Area Fire Prevention, Education and Wildland/Urban Interface Specialist (Area PEWS) is the FIREPRO funded FEPIS position. The position is located in the NER at Charlottsville, VA. and assists NCR and can be contacted through VICC.

The Area FEPIS provides assistance to the Park in conducting fire prevention and education programs. The Area FEPIS can also assist the park in evaluating park structures for wildland/urban interface issues and with an outreach interface program to park neighbors and local governmental bodies and agencies.

7. NPS Fire Management Program Center

The NPS Fire Management Program Center (FMPC) is located in Boise, Idaho and provides national leadership, direction, coordination and support for NPS fire, aviation and incident management. The primary purposes of the FMPC are:

- Achieving national mandates for firefighters, NPS employee and visitor safety.
- Protecting natural and cultural resources.
- Maximizing partnerships with federal, state, local and tribal entities, in order to achieve the greatest benefit for park resources.
- Achieving and maintaining the highest standard of professionalism using state-of-art concepts, technologies and practices.

B. FIREPRO Funding

Annual wildland fire management appropriation provides FIREPRO funding for necessary expenses for fire planning and oversight functions, along with budgeted activities necessary to prepare for the normal fire season, and for the development and implementation of the wildland fire emergency suppression, emergency rehabilitation, and hazard fuels reduction program.

The Park is not a base funded FIREPRO park and does not have FIREPRO funded positions. FIREPRO funding is available for approved fire training, prevention, preparedness, suppression, prescribed fire, wildland/urban interface, fuels treatment, and burned area emergency stabilization and rehabilitation projects. Related equipment, personal protective equipment and supplies may be acquired with FIREPRO funding. Financial grants may be provided to qualifying local fire departments through the Rural Fire Assistance Grant Program (RFA).

All FIREPRO funding requests are made through the Area Fire Management Officer.

C. Fire Management Organization

The Fire Management Committee will be comprised of the Park Assistant Superintendent, Fire Management Officer, Cultural/Natural Resource Specialist, Chief of Visitor Services, Safety Officer, Chief of Interpretation/Public Affairs and Facility Manager. The Fire Management Officer will chair the Committee. The Committee may request technical expertise from other individuals at any time. Each committee member will designate an alternate to serve in the event that the normal representative is unavailable.

In an effort to coordinate the Park's fire management program with those of other nearby NCR parks, representatives of the Area Fire Management Officer and those parks may meet to organize equipment and personnel needs relating to fire programs at each park.

The Fire Management Committee will convene at the request of the Park FMO or Superintendent. The primary purpose of the Committee is to coordinate preparedness, suppression, and prescribed fire activities between the Park's division's, and between the Park and cooperating agencies.

1. Committee Actions During Prescribed Burns

   During any active prescribed burn, the FMO, representing the Committee, will brief the Superintendent at least once daily, and as often as necessary, on the current fire situation. Alternatives and recommendations for any change in the management strategy for the fire will be presented. During the progress of any prescribed burn, the Prescribed Burn Boss will ensure that a contingency plan is prepared should the burn exceed prescription. The Superintendent has final and complete authority for all fire management decisions.

2. Committee Actions During Suppression Fires

   Any wildland fire that threatens to exceed the initial attack capabilities will have a qualified Incident Commander assigned to manage the fire. If a fire extends beyond one operational period, the Incident Commander will ensure that a Wildland Fire Situation Analysis (WFSA) is prepared.

3. Committee Actions During Non-Fire Periods

The Committee may be convened during periods of elevated fire danger to coordinate preparedness activities. The Committee will also be convened at other times to coordinate the Park's prevention, wildland/urban interface, prescribed fire and fuels treatment activities. As mentioned above, the Committee will coordinate equipment and personnel needs with those of other nearby parks with fire programs.

D. Wildland Fire Use Certification

The Park has rejected the strategy of wildland fire use. The Park's use of wildland fire will not be used at this time due to the lack of fire management staff, the adjacent wildland/urban interface considerations and the lack of knowledge concerning the role that fire has historically had on the Park's natural resources.

E. Interagency Coordination

Interagency cooperation is vital to the full realization of NPS fire management program objectives. The ability of a single agency to implement a fire management program of any complexity is limited without coordination with and assistance from other organizations. Interagency cooperation and the coordination of shared resources and common activities are critical to the success of the Park's fire management program.

1. Local Coordination

The NCR has a written cooperative agreement with the State of Maryland Department of Natural Resources for wildland fire suppression within the park and surrounding areas. The park also has verbal agreements for wildland fire suppression with the fire departments of the local communities. The Park plans to develop written cooperative agreements with these communities in the near future. These fire departments offer significant support to the Park fire management program.

2. Regional Coordination

Through an inter-agency agreement, NCR is a member of the Virginia Multi-agency Coordinating Group. This group is comprised of 3 NPS units including the NCR, SHEN and BLRI as well as VADOF, GWNF and F&WS. The Regional FMO coordinates fire management needs between the Area parks, MACG and with the SACC in Atlanta, GA.

Mobilization and dispatch of fire resources (staff, equipment, and supplies) is through the NCRCC via the Regional FMO. A list of available resources and detailed procedures for requesting assistance are documented in the NCRCC Fire Mobilization Plan. The mobilization plan is updated annually.

3. National Coordination

The National Park Service is a member of the Interagency Cooperative Fire Agreement and the National Wildfire Coordinating Group (NWCG). Participating members of the agreement include the U.S. Forest Service of the Department of Agriculture, the Bureau of Indian Affairs, Bureau of Land Management, National Park Service, and U.S. Fish and Wildlife Service of the Department of the Interior. Through additional agreements, state forestry and wildland fire agencies, private forestry companies, the Association of State Foresters, and many states participate in this agreement.

The principle objective of the Interagency Cooperative Fire Agreement is the cooperative and cost effective sharing of fire resources during national and regional emergencies. Through this agreement, a wide variety of fire resources and support services can be made available to units of the National Park Service. All requests for assistance through this agreement are directed to the SACC through the Regional FMO.

VI. MONITORING AND EVALUATION

A. Monitoring Programs

The park will implement long and short term monitoring to access accomplishments, and determine the effects of fire management activities on cultural and natural resources.

The Park will work closely with the Area FMO and Regional Prescribed Fire Specialist in developing and implementing a fire monitoring program. Assistance in conducting fire monitoring activities, including the establishment and sampling of monitoring plots, will be coordinated through the Area FMO.

B. NPS Fire Monitoring Handbook

This handbook will serve as the source document providing monitoring needs with minor adaptations made for local situations and conditions. An electronic copy can be found at http://www.nps.gov/fire/fmh/FEMHandbook.pdf

C. Fire Monitoring Plan

A Fire Monitoring Plan, based upon the protocols found in the *NPS Fire Monitoring Handbook* will be developed as part of the implementation of this Fire Management Plan.

VII. FIRE RESEARCH

Research is a necessary element in the fire management program at C & O Canal. The primary objective of fire research is to provide information for making fire management decisions. Fire research will be coordinated through the Natural Resource Specialist of the park.

As the park's Fire Management Plan is implemented and tested, additional research will inevitably be needed. Research will be identified for such purposes as refining prescriptions, improving the understanding of fire behavior and fire effects, refining monitoring protocols, defining fire return cycles, describing fuels dynamics, describing the impacts on cultural resources, and other information needed for operational fire and resource management.

Currently there are two PMIS statements calling for fire research at C&O Canal. PMIS 106934, *Determine Role of Fire in Eastern Bottomland Forest* and PMIS 106955, *Research Fire History.*

Monitoring will be a part of all prescribed fires conducted in the park. Monitoring will help to define the effectiveness of the fire management program by assessing the vegetative effects of fire. The monitoring protocols found in the *NPS Fire Monitoring Handbook* will be adapted and used by the park.

VIII. PUBLIC SAFETY

A. Public Safety Issues and Concerns

The Park is dedicated to ensuring the safety of each visitor and to all residents and property adjacent to the Park's boundary with regards to its fire management program. The Superintendent may close all or a portion of the Park (including roads and trails) when elevated fire danger, wildland fire or a prescribed fire pose an imminent threat to public safety.

B. Mitigation Safety Procedures

The Park will implement a notification system to inform visitors, neighbors, and political audiences of all fire activity through normal communication channels. A fire activity report will be updated, as significant changes occur to inform Park personnel of potential fire threats. Areas of fire activity will be clearly signed at the visitor center. Residents adjacent to the Park will be notified in advance of any prescribed fire. If any fire poses a threat outside the Park's boundaries, law enforcement agencies will be notified.

IX. PUBLIC INFORMATION AND EDUCATION

A. Public Information Capabilities and Needs

The Park is committed to keeping the public informed of its fire management program and activities. The Area Fire Prevention, Education and Wildland/Urban Interface Specialist (Area FEPIS) is an available resource to the Park for consultation, support and assistance.

B. Step-Up Public Information Activities

Information and education are important processes in public acceptance of the managed fire program at Park. The Park FMO will provide the Superintendent with accurate information regarding current fire situations and management activities. The public information program will be developed as follows:

- The public information outlets of neighboring and cooperating agencies, the area fire management office and the regional office will be provided with all fire management information.
- The fire management program will be discussed in informal talks with employees of all divisions, contractors, volunteers, residents, IBP's, SUP's, Agriculture leases, and park neighbors.
- The role of the fire management program will be developed and discussed, as appropriate, in off site programs and talks.
- The fire management program will be incorporated into visitor contacts, interpretive talks, walks, and tour programs. Particular attention will be given when fires are conspicuous from roads or visitor use areas.
- Concepts of the prescribed fire program will be incorporated, as appropriate, in publications, brochures and handouts.

Emergency closures or restrictions may become necessary during periods of elevated or extended fire danger. Such closures will necessitate additional coordination and communication with the public and the media.

X. PROTECTION OF SENSITIVE RESOURCES

A. Cultural and Historic Resources Needing Protection

The greatest cultural resource concern is the historic buildings located in the Park. Protection of these resources is focused on prohibiting any activity that causes damage to the structures or to the artifacts that are housed by these structures.

Historic Structures

There are a total of 1,365 historic structures within the park, most of which are deemed to be "contributing" elements to the Chesapeake and Ohio Canal National Historical Park historic district, listed in the National Register of Historic Places. This district is nationally significant for several reasons, including areas of architecture and engineering, commerce and transportation, military events, and conservation.

The most sensitive historic structures include 120 buildings (22 lock houses, 5 canal-operation buildings such as the Great Falls Tavern and section houses, 47 other historic buildings such as farm houses and their dependencies, 6 commercial structures such as stores and mills, and 4 governmental structures such as Washington Aqueduct features).

The canal-related structures include engineering works such as lift locks, culverts, bridges, waste weirs, and dams, primarily composed of fire-resistant materials such as stone, brick, and earth.

Museum Collections

Museum collections are exhibited at several locations throughout the park. These locations should be considered high-priority to protect sensitive property (Georgetown Visitor Center, Abner Cloud House, Great Falls Tavern, Riley's Lock, Ferry Hill, Williamsport Visitor Center, Hancock Visitor Center, and Cumberland Visitor Center).

Cultural Landscapes

There are 15 formally recognized cultural landscapes within the park, including the 184.5 miles of canal and prism. Specific landscapes have also been identified at Abner Cloud/Potowmack Canal, Antietam Village, Carrollton Manor Farms, Cumberland, Ferry Hill, Fort Duncan/Christian Smith Homestead, Four Locks, Great Falls Tavern, Hancock, Old Town, Point of Rocks, Two Locks/Opequon Crossing, Williamsport, and Western Maryland Railway.

B. Natural Resources Needing Protection

The C&O Canal is one of the most biologically diverse parks, especially for plant species, in the National Park system. The park has recorded over 1,200 species of vascular plants, including over 260 non-native plant species, over 100 rare, threatened or endangered species of plants in Maryland and The District of Columbia, and 1 federally endangered plant species. The number of rare plants represents one of the highest concentrations of state-listed rare plants in the eastern US. Several species are globally rare, and some occur here because they are dependent upon special habitats and ecological conditions present along the Potomac River. 192 birds, 64 fish, 62 reptiles and amphibians, and 47 species of mammals are also documented. Ptilimnium nodosum (harperella), the one federally endangered plant species in the National Capital Region, is currently being reintroduced into the park. Several rare aquatic biotas have either been found or are suspected to exist in the seeps, springs and cave communities of the park. Several bald eagle nests are monitored year round for activity.

The rich geological, ecological and biological diversity preserved inside the boundaries of the park include a wealth of communities such as riparian, terrace, upland forest, seeps and springs, cave and wetlands. More than 40 state and nationally significant natural areas, including Appalachian shale barren communities (areas that harbor

globally rare plants, rare limestone outcrops and scoured bedrock floodplain, are found in the park. The park also protects the largest extant block of upland forest in Maryland's Piedmont, the Goldmine tract, and the highest quality limestone and calcareous shale habitats remaining in the state, Ferry Hill bluffs and Chilton Woods. The largest significant natural area is the Potomac Gorge in Montgomery County and in the District of Columbia.

Aquatic environments in the park include wetlands, streams, rivers, springs and seeps, and open water habitat in the sections of watered canal. These habitats support animals such as frogs, toads, salamanders, fish, freshwater mussels, beaver, and muskrat. Terrestrial habitats such as forests, open fields, rocky outcrops, developed, and transition habitats support many common Eastern Deciduous woodland species: deer, song birds, red and gray fox, raccoon, gray and fox squirrels, and a few uncommon species, like the black bear and bobcat. Bald eagle, a federally threatened species, nests here.

The park is home for numerous year round bird species and neo-tropical migratory travel through the park from South and Central America, the Caribbean and southern US to North American nesting habitats. The Potomac River floodplain provides habitat for many migrating and breeding birds and is becoming increasingly important as natural areas are lost or fragmented in Maryland and all over the U.S. The American Bird Conservancy and National Audubon Society have designated C&O Canal as an Important Bird Area (IBA) in the U.S., small sites critical to rare species or that support large concentrations of a species.

The park contains a diverse native mussel community, including several species that are state and federally endangered. Native mollusks, or mussels, are the most imperiled aquatic fauna in North America and continue to decline primarily due to habitat loss and invasion of non-indigenous species. Of nearly 300 species of mussels in North America, 13 are considered extinct and 57 are designated federally endangered or threatened species. Of the 20 species of freshwater mussels in Maryland, 10 are in C&O Canal NHP.

C. Developments, Infrastructure, and Improvements Needing Protection

As funding allows, defensible space will be maintained around buildings, structures, and other improvements in the Park.

XI. FIRE CRITIQUES AND ANNUAL PLAN REVIEW

The Incident Commander or the Burn Boss will initially critique wildland and prescribed fires. This critique should take place with those directly involved in the management of the fire.

The Park Fire Management Committee should review prescribed and wildland fires of significant size, cost, or where minor safety issues or minimal levels of public concern occur. These findings should be forwarded to the Area Fire Management Officer.

Prescribed or wildland fires involving an Incident Management Team or significant political, safety, or public issues should be reviewed by the Regional Fire Management Officer. If a fire generates a major political or public concern, involves multiple serious injuries or a fatality, the Regional Fire Management Officer and the NPS Fire Management Program Center should participate in the review.
.
The Park FMO will review the Fire Management Plan annually for currency and incorporate changes into the appendix. Changes to the appendices require approval of the Fire Management Committee. The fire management plan is subject to formal review every five years.

XII. CONSULTATION AND COORDINATION

The following people were involved in the formulation and preparation of this fire management plan:

Park Staff
Regional Staff
CHOH Advisory Committee
Harpers Ferry NHP
Antietam NB
George Washington Memorial Parkway
Great Falls Park
USPP
Rock Creek Park
MD DNR
US F&WS

XIII. APPENDICES

Appendix A: References Cited

Appendix B: 2001 Federal Wildland Fire Management Policy compliance

Appendix C: Definition of terms

Appendix D: Wildland Fire Implementation Plan

Appendix E: Fire Call up list

Appendix F: Fire equipment location

Appendix G: Local Fire Department List

Appendix H: Compliance Information

Appendix A: References

DO 12, NEPA

DO 18, The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide, (1998). And attendant Reference Manual (RM-18).

Federal Wildland Fire Management Policy and Program Review

National Park Service, Organic Act, August 25, 1916

National Park Service, Public Law 91-664, establishing Chesapeake & Ohio Canal National Historical Park

Chesapeake & Ohio Canal National Historical Park, Statement for Management 1991

Chesapeake & Ohio Canal National Historical Park, Land Protection Plan 2003

Chesapeake & Ohio Canal National Historical Park, Resource Management Plan 1996

Appendix B
2001 Federal Wildland Fire Management Policy compliance

1. SAFETY
Firefighter and public safety is the first priority. This Fire Management Plan and all activities described within reflect this commitment.

2. FIRE MANAGEMENT AND ECOSYSTEM SUSTAINABILITY
The full range of fire management activities will be used to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social components.

3. RESPONSE TO WILDLAND FIRE
The 2001 Federal Wildland Fire Management Policy considers fire a critical natural process to be integrated into land and resource management plans and activities on a landscape scale, and across agency boundaries. The response to wildland fire presented in this Fire Management Plan is limited to suppression activities only.

4. USE OF WILDLAND FIRE
The 2001 Federal Wildland Fire Management Policy states that wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role. This Fire Management Plan does not allow the use of wildland fire for resource benefit.

5. REHABILITATION AND RESTORATION
Rehabilitation and restoration efforts will be undertaken to protect and sustain ecosystems, public health, and safety, and to help communities protect infrastructure.

6. PROTECTION PRIORITIES
The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be based on the values to be protected, human health and safety, and the costs of protection. Once people have been committed to an incident, these human resources become the highest value to be protected.

7. WILDLAND URBAN INTERFACE
The operational roles of federal agencies as partners in the Wildland Urban Interface are wildland firefighting, hazardous fuels reduction, cooperative prevention and education, and technical assistance. Structural fire suppression is the responsibility of tribal, State, or local governments. Federal agencies may assist with exterior structural protection activities under formal Fire Protection Agreements that specify the mutual responsibilities of the partners, including funding.

8. PLANNING
Every area with burnable vegetation must have an approved Fire Management Plan. Fire Management Plans are strategic plans that define a program to manage wildland and prescribed fires based on the area's approved land management plan. Fire Management Plans must provide for firefighter and public safety; include fire management strategies, tactics, and alternatives; address values to be protected and public health issues; and be consistent with resource management objectives, activities of the area, and environmental laws and regulations.

This Fire Management Plan is a strategic plan that provides for firefighter and public safety, addresses values to be protected, public health issues, and is consistent with resource management activities, activities of the area, and is consistent with environmental laws and regulations.

9. SCIENCE
Fire Management Plans and programs will be based on a foundation of sound science. Research will support ongoing efforts to increase our scientific knowledge of biological, physical, and sociological factors. Information needed to support fire management will be developed through an integrated interagency fire science program. Scientific results must be made available to managers in a timely manner and must be used in the development of land management plans, Fire Management Plans, and implementation plans.

This Fire Management Plan is based upon, and utilizes, the best available science and relevant research available.

10. PREPAREDNESS
Agencies will ensure their capability to provide safe, cost-effective fire management programs in support of land and resource management plans through appropriate planning, staffing, training, equipment, and management oversight.

This Fire Management Plan provides guidance for safe, cost-effective fire management, supporting land and resource management plans through appropriate preparedness activities.

11. SUPPRESSION
Fires are suppressed at minimum cost, considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives.

12. PREVENTION
C & O Canal will work together and with their partners and other affected groups and individuals to prevent unauthorized ignition of wildland fires.

13. STANDARDIZATION
Agencies will use compatible planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management activities.

C & O Canal is an active participant in, and contributor to, interagency planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management.

14. INTERAGENCY COOPERATION AND COORDINATION
Fire management planning, preparedness, prevention, suppression, fire use, restoration and rehabilitation, monitoring, research, and education will be conducted on an interagency basis with the involvement of cooperators and partners.

C & O Canal is an active participant in, and contributor to, interagency planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management.

15. COMMUNICATION AND EDUCATION
Agencies will enhance knowledge and understanding of wildland fire management policies and practices through internal and external communication and education programs. These programs will be continuously improved through the timely and effective exchange of information among all affected agencies and organizations.

C & O Canal is an active participant in, and contributor to, interagency planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management.

16. AGENCY ADMINISTRATOR AND EMPLOYEE ROLES

Agency administrators will ensure that their employees are trained, certified, and made available to participate in the wildland fire program locally, regionally, and nationally as the situation demands. Employees with operational, administrative, or other skills will support the wildland fire program as necessary. Agency administrators are responsible and will be held accountable for making employees available.

17. EVALUATION

Agencies will develop and implement a systematic method of evaluation to determine effectiveness of projects through implementation of the 2001 Federal Fire Policy. The evaluation will assure accountability, facilitate resolution of areas of conflict, and identify resource shortages and agency priorities.

C & O Canal is an active participant in, and contributor to, interagency planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management.

Appendix C
DEFINITION OF TERMS

Chain: A unit of measure equal to 66 feet.

Control Line: A comprehensive term for all the constructed and natural fire barriers and treated fire edges used to control a fire.

Direct Method: A method of suppression that treats the fire as a whole, or all its burning edges, by wetting, cooling, smothering, or chemically quenching the fire, or by mechanically separating the fire from unburned fuel.

Fire Weather: Weather conditions which influence fire ignition, behavior, and suppression.

Fire Management Plan: A strategic plan that defines a program to manage wildland fires. This plan is supplemented by operational procedures such as preparedness, preplanned dispatch burn plans and prevention.

Flame Length (FL): The length of a flame measured from the base of the flame to its tip and parallel to the length of the flame. Flame length is measured on a slant when the flame is tilted due to the effects of wind and slope.

Fuel Model: A simulated fuel complex for which all fuel descriptions required by the mathematical fire spread model have been specified.

Fuel Type: An identifiable vegetative association of fuel elements of distinctive species, form, size, arrangement, or other characteristics.

Hazard Fuels: Fuels that, if ignited, have significant potential to threaten human life and safety, real property, park resources, or carry fire across park boundaries.

Indirect Attack: A method of suppression in which the control line is located along natural firebreaks, favorable breaks in topography, or at considerable distance from the fire.

Initial Action: Action taken by the first resources to arrive at a wildland fire to meet protection and fire use objectives.

Minimum Impact Suppression Tactics (MIST): The application of techniques that effectively accomplish wildland fire management objectives while minimizing the impacts to cultural and natural resources commensurate with ensuring public and firefighter safety and effective wildland fire control.

National Fire Danger Rating System (NFDRS): A multiple index scheme designed to provide fire control and land management personnel with a systematic means of assessing various aspects of fire danger on a day-to-day basis.

Planned Ignition: A fire ignited by management actions to meet specific objectives.

Preparedness: Activities that help to provide a safe, efficient and cost effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

Prescribed Fire: A fire ignited by park managers under known conditions of fuel, weather, and topography to achieve specific objectives. An approved prescribed fire plan must be completed and NEPA requirements must be met prior to ignition.

Prescription: Measurable criteria that guide selection of appropriate management strategies and actions. Prescription criteria may include economic, public health, environmental, geographic, administrative, social or legal considerations.

Rate of Spread (ROS): The time it takes the leading edge of a flaming fire front to travel a known distance. Rate of spread is commonly measured in chains/hour and meters/second.

Suppression: management actions intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Unplanned Ignition: A wildland fire not ignited by management actions.

Wildland: Any area under fire management jurisdiction of a land management agency.

Wildland Fire: Any fire, other than prescribed fire that occurs in the wildland.

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative management strategies against selected environmental, social, political, and economic criteria.

Weather Information Management System (WIMS): An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource agencies.

APPENDIX D
WILDLAND FIRE IMPLEMENTATION PLAN STAGE 1

Fire Name					
Fire Number					
Jurisdiction(s)					
Administrative Unit(s)					
FMP Unit(s)					
Geographic Area					
Management Code					
Start Date/Time					
Discovery Date/Time					
Current Date/Time					
Current Size					
Location:	Legal Description(s)	T.	R.	Sec.	Sub.
	Latitude				
	Longitude				
	UTM:				
	County:				
	Local Description				
Cause					
Fuel Model/Conditions					
Current Weather					
Predicted Weather					
Availability of Resources					

DECISION CRITERIA CHECKLIST

Decision Element	Yes	No
Is there a threat to life, property, or resources that cannot be mitigated?		
Are potential effects on cultural and natural resources outside the range of acceptable effects?		
Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?		

Is there other proximate fire activity that limits or precludes successful management of this fire?		
Are there other Agency Administrator issues that preclude wildland fire use?		

The Decision Criteria Checklist is a process to assess whether or not the situation warrants continued wildland fire use implementation. A “Yes” response to any element on the checklist indicates that the appropriate management response should be suppression-oriented.

Recommended Response Action (check appropriate box)	NO-GO (Initial attack/suppression action)	
	GO (Other appropriate management response)	

Signature	Date

Appendix: E
Fire Call-Up List

There are approximately 30 trained, equipped and ready firefighters on the CHOH staff. The park FMO, the NCRCC and the Regional FMO office maintains a current list of available firefighters. Additional NPS firefighters are available throughout the parks in the National Capital Region.

Refer to pages 35 and 36 for the Step Up Staffing Plan for C&O Canal.

Additionally, the following is an available reference through the Maryland Forest Service.

MARYLAND FOREST SERVICE

WESTERN REGION

FIRE SEASON STAFFING LEVELS

10/30/2003

STAFFING LEVEL	ERC	BI
1	0 - 6	0 - 8
2	7 – 11	9 – 17
3	12 – 22	18 – 34
4	23 – 26	35 – 39
5	27 - >	40 - >
90th Percentile	22	34
97th Percentile	26	39

Based on weather data from the Green Ridge RAWS from 1999 - 2003

Appendix F:

Fire Equipment Inventory/Location

Equipment Cache is located at Great Falls Ranger Station and includes hand tools to equip two squads of firefighters.

Cache also has enough PPE to equip one squad. All other PPE has been issued to CHOH firefighters. There are approximately 30 trained, equipped and ready firefighters on the CHOH staff.

Appendix G

Allegany County Fire Companies

Oldtown VFD
P.O. Box 83
Oldtown, MD 21555

Orleans Volunteer Fire Company
Box 126
Little Orleans, MD 21766

District 16 VFD, Inc.
Route 4, Box 231
Cumberland, MD 21502

Cumberland City FD
20 Bedford St.
P.O. Box 1702
Cumberland, MD 21502

Washington County

Sharpsburg VFC
P.O. Box 297
110 W. Chapling St.
Sharpsburg, MD 21782

Williamsport VFD
2 Brandy Drive
Williamsport, MD 21795

Clear Spring VFC
P.O. Box 400
Clear Spring, MD 21722

Potomac Valley FC
2202 Dargan School Rd
Sharpsburg, MD 21782

Hancock Fire Company INC.
Fulton Street
Hancock, MD 21750

Fairplay VFC
Tilghmanton Rd.
Fairplay, MD 21733

Frederick County

Brunswick VFC
223 W. Potomac St.
Brunswick, MD 21716

Carroll Manor FC
2795 Adams St.
Adamstown, MD 21710

Montgomery County

Cabin John FD # 30
9404 Falls Rd.
Potomac, MD 20854

Cabin John FD #33
11430 Falls Rd.
Potomac, MD 20854

Fire Administrator
101 Monroe Street, 12th Floor
Rockville, Maryland 20850

Bethesda-Chevy Chase Rescue
5020 Battery Lane
Bethesda, Maryland 20814

Loudon County VA

Lovettsville FD
12837 Berlin Turnpike
Lovettsville, VA. 20180

Lucketts FD
42367 Lucketts Rd.
Leesburg, VA. 20176

Sterling FD
46700 Middlefield Dr.
Sterling, VA 22066

Jefferson County WV

Shepherdstown VFD
P.O. Box F
Shepherdstown, WV 25443

Friendship VFD
P.O. Box 126
Harpers Ferry, WV 25425

Blue Ridge VFD
Rt. 1 Box 740
Harpers Ferry, WV 25425

Morgan County WV

Berkeley Springs FD
34 Mercer St.
Berkeley Springs, WV 25411

FIRE DATE	LOCATION	SIZE	CAUSE	DATE
January 31, 1993	DAM 5	0.1 ACRES	CAMPFIRE	1/31/1993
November 22, 1993	MCMAHONS MILL	0.8 ACRES	CAMPFIRE	11/22/1993
November 8, 1994	DARGAN, BACK ROAD, MD	3.0 ACRES	CHILDREN	11/8/1994
February 25, 1995	LOCK 8 PARKING	0.5 ACRES	CHILDREN	2/25/1995
April 6, 1995	BILLY GOAT TRAIL	0.05 ACRES	UNKNOWN	4/6/1995
April 28, 1996	GOLDMINE LOOP TRAIL	0.5 ACRES	MISCELLANEOUS	4/28/1996
May 31, 1996	VIOLETTES LOCK	0.1 ACRES	CAMPFIRE	5/31/1996
January 5, 1997	DARGAN BEND, MD	0.5 ACRES	SMOKING	1/5/1997
April 25, 1997	BACKROAD, MD	0.1 ACRES	MISCELLANEOUS	4/25/1997
May 15, 1997	SANDY HOOK, MD	0.1 ACRES	UNKNOWN	5/15/1997
July 28, 1997	OLMSTED ISLANDS, NEAR OVERLOOK	0.1 ACRES	UNKNOWN	7/28/1997
April 6, 1998	SANDY HOOK, MD	0.2 ACRES	RAILROAD	4/6/1998
April 6, 1998	KEEP TRYST RD	0.1 ACRES	RAILROAD	4/6/1998
September 1, 1998	RIVER TRAIL, GREAT FALLS AREA	0.1 ACRES	SMOKING	9/1/1998
September 18, 1998	EDWARDS FERRY RD/Old River Rd, MD	0.1 ACRES	MISCELLANEOUS	9/18/1998
September 18, 1998	MEXICO FARMS, MP 176	0.1 ACRES	UNKNOWN	9/18/1998
November 21, 1998	PAWPAW, MD	0.5 ACRES	CAMPFIRE	11/21/1998
November 24, 1998	MCMAHONS MILL	0.1 ACRES	CAMPFIRE	11/24/1998
November 24, 1998	AVIS MILL	3 ACRES	CAMPFIRE	11/24/1998
November 28, 1998	FOUR LOCKS, MD	0.1 ACRES	INCENDIARY	11/28/1998
March 8, 1999	FLETCHERS BOATHOUSE	0.9 ACRES	UNKNOWN	3/8/1999
November 10, 1999	TAYLORS LANDING	0.2 ACRES	CAMPFIRE	11/10/1999
November 16, 1999	GARRISON HOLLOW RD	0.4 ACRES	INCENDIARY	11/16/1999
November 19, 1999	DAM #5	0.1 ACRES	INCENDIARY	11/19/1999
May 7, 2000	I81 INTERSTATE BRIDGE and shoreline	0.1 ACRES	UNKNOWN	5/7/2000
June 27, 2000	GREAT FALLS ENTRANCE ROAD	0.01 ACRES	UNKNOWN	6/27/2000
July 5, 2001	PENNYFIELD AREA	0.01 ACRES	CAMPFIRE	7/5/2001
August 8, 2001	MCMAHONS MILL AREA	0.1 ACRES	CAMPFIRE	8/8/2001
October 7, 2001	POINT OF ROCKS, MD	1.5 ACRES	CAMPFIRE	10/7/2001
November 10, 2001	BRUNSWICK, MD	1.5 ACRES	INCENDIARY	11/10/2001
December 22, 2001	WILLIAMSPORT, CONO CREEK	0.5 ACRES	UNKNOWN	12/22/2001
January 28, 2002	LOCK 28, POINT OF ROCKS, MD	1.5 ACRES	CAMPFIRE	1/28/2002